

STRESS ULCER PROPHYLAXIS PROTOCOLS IMPACT ON INTENSIVE CARE UNIT PATIENTS FOLLOWED THROUGH CONTINUUM OF CARE: EVALUATING APPROPRIATENESS OF ACID SUPPRESSION THERAPY, COSTS AND ADVERSE EVENTS

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Purpose: Buckley et al, presented that 70% of general medical and intensive care unit (ICU) patients received inappropriate stress ulcer prophylaxis (SUP). Additionally, 73% to 90% of patients discharged from the hospital also received inappropriate SUP. Yearly financial burden decreased by \$200,000 in their hospital after initiation of pharmacy driven protocol. Purpose of my project is to implement SUP protocol which aims to reduce inappropriate use on ICU patients and followed to general floor and/or upon hospital discharge. The impact of financial and potential adverse effects due to initiation of the protocol will also be evaluated. **Methods:** Submission will be made to the Institutional Review Board for this project. SUP protocol provides indications (presence of at least one major or two or more minor risk factors) that will qualify patient for SUP agent. Pharmacists will check appropriateness by evaluating SUP daily. If patient no longer has risk factors, pharmacist will discontinue SUP in 48 hours, unless the physician specifically request continuation. Pharmacists complete a progress note in patients chart to notify the physician. Progress note will reiterate the protocols major and minor risk factors. Pharmacists will begin implementation of protocol with ICU patients and follow through to general floor and upon discharge. Resident will review the ICU patients throughout the continuum of care and assess application and impact of the protocol. Additionally, resident will gather data from medical records including demographics, concomitant illnesses, length of stay, duration of therapy costs, adverse events from SUP discontinuation, bleeding risks, major risk factors and minor risk factors. Data will be compared from this prospective study with two retrospective studies also completed at our hospital to assess appropriateness of stress ulcer prophylaxis, cost reductions and adverse events from protocol initiated discontinuation. Results and conclusion will be presented at Great Lakes Pharmacy Resident's Conference.

Learning Objectives:

Identify number of major and minor risk factors present in a patient that warrants a stress ulcer prophylaxis agent.

Discuss the implications of stress ulcer prophylaxis in terms of adverse events and bleeding risks when discontinued.

Self Assessment Questions:

How many risk factors are present in this patient: a 44 year old male presented to the ICU after a motor vehicle accident. Patient sustained multiple injuries including a spinal cord injury. He remains

- A: 1 minor and 1 major
- B: 1 minor and 2 major
- C: 2 minor and 2 major
- D: 3 minor and 2 major

Why is appropriateness of stress ulcer prophylaxis agent so important?

- A: Incidence of adverse events such as Clostridium Difficile infection
- B: Overuse may cause bleeding
- C: Decreasing costs observed if therapy no longer warranted
- D: A and C

Q1 Answer: B Q2 Answer: D

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PHARMACIST SKILLS GAP ANALYSIS

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Purpose: The purpose of this work is to develop and conduct a broad-based assessment of the pharmacists skills necessary for contemporary practice and future roles, and to establish an action plan to address gaps determined to be of highest priority. Pharmacists possess a level of foundational knowledge that evolves in accordance with the culture of the health care organization; however, within a large pharmacy department across multiple practice sites, there may be variability in practice amongst the nearly 500 employed pharmacists based on an individuals focus and interests. Advancement of the department requires recognition of these gaps in order to raise the baseline and to prepare for innovations in pharmacy practice. **Methods:** A literature search of publications from ASHP, ACCP, APhA, and the CAPE outcomes was done to determine current standards of pharmacy practice. Pharmacy leaders from various settings within our organization were consulted regarding areas in practice that were of interest specific to Aurora Health Care. From there, a list of skill sets were formed and transposed into a survey. The aim of the survey is to obtain the pharmacists self-assessment of their knowledge and ability, and the corresponding opinion of the importance of a particular skill. The perspectives of both the pharmacist and department leadership will be surveyed. A pilot survey has been sent to a select group of individuals including both pharmacists and department leadership. Feedback and results will be reviewed prior to releasing the survey system-wide. An analysis of the results will be performed, and a prioritized list of skills will result. Subsequently, an action plan will be created to address skills determined to be of highest priority. **Results and Conclusions:** Response analysis in progress. Results and conclusions to be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize the rationale for conducting a pharmacist practice skills gap analysis

Identify two perspectives utilized in a pharmacist performance review

Self Assessment Questions:

Which of the following statements best describes the rationale for conducting a pharmacist skills gap analysis?

- A: Salary adjustment
- B: Practice advancement
- C: Patient satisfaction
- D: Organization comparison

Which of the following perspectives should be considered when evaluating the pharmacists performance?

- A: Pharmacist
- B: Provider
- C: Pharmacy Supervisor
- D: Both A and C

Q1 Answer: B Q2 Answer: D

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GENTAMICIN UTILIZATION AS INFECTION PROPHYLAXIS IN OPEN FRACTURES

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Purpose: Open fractures occur from blunt force or penetrating trauma secondary to automobile accidents or gunshot wounds. Fragments of bone disrupt soft tissue and expose it to the environment which increases the likelihood of bacterial penetration into the area and subsequent infection. Gram-positive organisms are most commonly isolated with an increased risk of infection from gram-negative organisms in Gustilo-Anderson type III fractures. The Eastern Association for the Surgery of Trauma provides a level I recommendation to initiate antimicrobial prophylaxis with a first generation cephalosporin for any open fracture in addition to an aminoglycoside for those classified as type III. The purpose of this analysis is to evaluate the appropriateness of aminoglycoside prophylaxis used in patients presenting with open fractures. **Methods:** This is a single-center, retrospective cohort analysis in patients who presented to the emergency department from January 1, 2015 through October 31, 2016 with an open fracture requiring the use of gentamicin. A gentamicin utilization report was generated to identify patients for inclusion in the study. Proper documentation, fracture type, and antibiotics administered were analyzed. Patients with a documented type III open fracture who received gentamicin were classified as appropriate while patients with no documentation or with a documented type I or II open fracture who received gentamicin were classified as inappropriate. **Results:** In the year of 2016, 45 patients with open fractures received gentamicin. Of those 45 patients 26 (58%) did not have documentation for the type of fracture. Of the 19 patients with appropriate documentation of fracture type, 17 (89%) were documented as either a type I or II open fracture. Only 2 (11%) of documented open fractures were type III. Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review the appropriate use of antibiotics for open fracture prophylaxis
Discuss the role of gentamicin in open fractures

Self Assessment Questions:

When should antibiotics be initially administered to a patient with an open fracture?

- A After surgery is complete
- B: As soon as possible
- C: 8 hours post-injury
- D: Avoid administering antibiotics if possible

Patient TAB presents to the Emergency Department with a single gunshot wound to the left thigh and obvious deformity. Imaging studies reveal an open fracture of the left femur. The wound is clean and

- A Cefepime
- B Cefazolin
- C Cefazolin + Gentamicin
- D Gentamicin

Q1 Answer: B Q2 Answer: B

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EFFECT OF INPATIENT ANTICOAGULATION DURATION ON MORTALITY IN PATIENTS WITH PULMONARY EMBOLISM

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Purpose: The 10th Edition of the American College of Chest Physicians (CHEST) guidelines do not provide specific guidance regarding the ideal initial treatment setting for patients with acute pulmonary embolism (PE) who are moderate-high risk of short-term mortality. The risks and benefits of hospital discharge prior to five days of inpatient anticoagulation are not known in this population. **Methods:** This was a retrospective, cohort analysis of patients with a PE who are at moderate-high risk at the Edward Hines Jr. VA Hospital between 2007 and 2016. Patients were included in this study if they had imaging-confirmed pulmonary embolism, were at moderate-high risk of short-term mortality (PESI risk class III-V) and received anticoagulation as a result of the PE. Patients who were terminally ill, were receiving treatment-dose anticoagulation at the time of PE, had mechanical heart valves or moderate to severe mitral stenosis, or who had significant hepatic disease were excluded from analysis. This study compared 90-day mortality in patients with moderate-high risk PE who received fewer than 5 days of inpatient anticoagulation to those who received 5 or more days of inpatient anticoagulation. This study required 200 patients in each group to detect a two-fold increase in mortality, which was evaluated with the Chi-squared test and subsequent logistic regression to control for confounding variables. **Results/Conclusion:** These will be presented at Great Lakes Pharmacy Resident Conference

Learning Objectives:

Identify risk factors associated with increased mortality in patients with pulmonary embolism included in the pulmonary severity index (PESI) score.

Recognize patients who can receive initial outpatient anticoagulation based on PESI score.

Self Assessment Questions:

Which of the following risk factors contribute to a higher pulmonary severity index score?

- A Female Gender
- B: History of Diabetes
- C: Respiratory Rate of 25
- D: Altered Mental Status

Which of the following PE patients could safely receive outpatient anticoagulation based on the CHEST guidelines?

- A 50 year old male who presented to the ED with altered mental status
- B 68 year old male who presented to the ED with early stages of dementia
- C 78 year old female who presented to the ED with a heart rate of 78
- D 57 year old female who presented to the ED with blood pressure of 100/60

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-447L01-P

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ESTABLISH A SINGLE ROLL-OUT CONCEPT FOR FORMULARY-RELATED CHANGES

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Purpose: Coordinating a change to formulary involves multiple factors such as preparing required paperwork, requesting the build into the electronic health record (EHR), and staff education. Currently the health system utilizes a checklist that summarizes the steps to be taken both prior to and after a medication is approved for formulary addition by the Pharmacy & Therapeutics Committee, however, adherence to this process is not consistent. The greatest disparity is seen with overall communication, as well as the submission of the request to build a drug into the EHR. In the last two years, approximately 30% of new formulary additions had the request submitted within the timeframe outlined by the checklist. The purpose of this project is to coordinate all components related to formulary changes by developing a single roll-out procedure for relaying all relevant information. **Methods:** In order to refine the formulary addition process, the first step was to identify all of the components that are related to a change in formulary by reviewing the current process and all required materials. Meetings were scheduled with representatives from each constituent (including pharmacy, purchasing, health information technology, and nursing) to gain a better understanding of each role and to identify recurrent issues that can be addressed. Based on their feedback, the relevant forms were updated so that any missing information can be captured early on in the process. The final step will be to create a flowchart that depicts the overall process and associated timeline. This will then be presented to a task force for validation and to evaluate the need for further interventions, such as creating a formulary addition committee. This project is exempt from review by the Institutional Review Board. **Results/Conclusions:** The results and conclusions will be presented at the 2017 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify the various components related to a formulary addition or change.
Discuss the potential obstacles that must be overcome in order to develop a streamlined process for coordinating changes to formulary.

Self Assessment Questions:

Coordinating formulary-related changes involves multiple disciplines, such as:

- A: Human Resources
- B: Health Information Technology
- C: Health System Research Institute
- D: Laboratory Services

Which of the following is a component of coordinating formulary related changes?

- A: Year of FDA approval
- B: Physician preference for quantity to obtain
- C: Preparation of a full drug monograph
- D: Pharmacy director's preference for storage site

Q1 Answer: B Q2 Answer: C

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IMPLEMENTATION OF AN ELECTRONIC VERIFICATION WORKFLOW SYSTEM IN NONSTERILE COMPOUNDING

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Purpose: Recommendations from the PPMI Summit cited sufficient pharmacy resources must be available to safely develop, implement, and maintain technology-related medication-use safety standards. One such strategy is electronic workflow systems. Implementation of electronic workflow systems within the pharmacy have been successful internally in sterile compounding. The major purpose of these technologies is to provide a safety enhancement over current practices including, but not limited to, identification of incorrect product selection prior to compounding. The United States Pharmacopeia provides guidance on applying good compounding practices (e.g. facilities, competency, training, documentation, database management, and records) for the preparation of nonsterile compounds and formulations. Nonsterile compounding errors exist and have the potential to cause patient harm. Therefore, it is important pharmacy departments maximize the capabilities of respective workflow systems. **Methods:** The technology implemented allows streamlined capture of simple, moderate, and complex manipulations within a web-based system additionally capturing all compounding records for each compound dispensed. The intent of this research-in-progress is to evaluate the impact of an electronic workflow system to assess throughput and accuracy in the nonsterile compounding environment. Secondary objectives include evaluating the impact of electronic verification in regards to patient safety and waste. Data analyzed will include the turnaround time for all first dose and cart fill dispenses of oral syringes in respective pharmacists as well as product selection accuracy rate and pharmacist rejection rates. Historic data was collected through anecdotal reports, point-of-event records, and time studies. Post-implementation, data will be electronically captured through the web-based system based on orders for oral liquid dosage forms processed through the main pharmacy and pediatric dispensing satellite settings. **Results & Conclusion:** Data collection and analysis is ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe an electronic verification workflow system and highlight its operational role in nonsterile compounding.
Discuss considerations for implementation integrating barcode verification and image-capture capabilities.

Self Assessment Questions:

USP <795> provides guidance in nonsterile compounding practices including:

- A: Documentation & Database Management
- B: Competency & Training
- C: Tracking & Tracing
- D: A & B

Electronic verification workflow systems may impact the following, except:

- A: Patient safety
- B: Patient satisfaction
- C: Throughput
- D: Waste

Q1 Answer: D Q2 Answer: B

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EVALUATION OF BODY COMPOSITION BY COMPUTED TOMOGRAPHY AS A PREDICTOR OF TOXICITY AND SURVIVAL IN PATIENTS WITH PANCREATIC CANCER TREATED WITH FOLFIRINOX CHEMOTHERAPY.

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Purpose: Chemotherapy dosing based on the body surface area (BSA) does not take into account several important sources of interindividual variations in body composition. Cancer patients are highly variable in their body composition, specifically in the proportion of fat and muscle and can develop severe muscle wasting, termed sarcopenia. Patients with sarcopenia have more severe treatment related toxicity requiring delays, dose reductions and stopping of treatment, as well as reduced survival. High-resolution computed tomography (CT) imaging routinely performed at baseline and during follow-up provides valuable information on body composition. The influence of body composition on outcomes and the occurrence of toxicities can therefore be explored. **Objective:** The purpose of this study was to elucidate the effect of decreased muscle mass on the toxicity and survival in patients with pancreatic cancer treated with FOLFIRINOX chemotherapy. **Methods:** Adult patients with locally advanced or metastatic pancreatic cancer treated with FOLFIRINOX chemotherapy were retrospectively analyzed. A dose limiting toxicity was defined as any toxicity leading to dose reduction, treatment discontinuation or delay in therapy. Body composition was evaluated using the most recent CT scan prior to treatment initiation. Patients were considered sarcopenic if the skeletal muscle index was less than 52.4 cm²/m² for males and less than 38.5 cm²/m² for females. Clinical outcomes were compared between the sarcopenic and non-sarcopenic groups. Results and conclusions to be presented at the GLPRC

Learning Objectives:

Recognize clinical implications of sarcopenia
Discuss limitations of current chemotherapy dosing

Self Assessment Questions:

Which of the following is true regarding sarcopenia?

- A Sarcopenia is the gain of muscle mass, strength, and function.
- B: Body surface area (BSA) directly correlates with sarcopenia
- C: Sarcopenia is associated with a decreased life-expectancy
- D: Chemotherapy associated toxicities are decreased in those with sarcopenia

Which of the following is true regarding body surface area (BSA) and lean body mass (LBM)?

- A LBM is the same as BSA
- B BSA takes into account body composition
- C LBM takes into account interpatient heterogeneity in body composition
- D BSA is the most accurate predictor for chemotherapy induced toxicity

Q1 Answer: C Q2 Answer: C

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BEHAVIORS AND ATTITUDES OF PHARMACY TECHNICIANS ASSOCIATED WITH MEDICATION THERAPY MANAGEMENT (MTM) OUTCOMES

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Purpose: The purpose of this study is to identify the association between pharmacy technicians' attitudes and behaviors towards participating in medication therapy management (MTM) and store level MTM net effective rates (NERs). **Methods:** A previously published 27-item survey tool based on the Theory of Planned Behavior was modified for the purpose of this study. Survey items will be utilized to collect data on participants' behavior and attitudes towards involvement in MTM services. Survey items will be rated on a 5-point Likert scale. Additional survey items will collect participant and pharmacy site demographics. Pharmacy technicians and pharmacists (one from each pharmacy location, total n=232), representing 116 community pharmacy locations within a large, national grocery store chain, will be contacted to complete a phone survey during February 2017. Pharmacists are being surveyed to include their attitudes as a covariate in the analyses. A draft survey was piloted by 3 pharmacists and 3 pharmacy technicians to determine survey logistics and subsequent modifications. The study protocol was approved by the Institutional Review Board in December 2016.

Additionally, an internal reporting tool will be used to report average NERs for each pharmacy location for the 6 month window prior to survey administration. NERs are calculated each week as a percentage: (Total # of successfully completed MTM cases / Total # of available MTM cases). Pharmacist and technician responses will be linked by unique, non-meaningful, survey codes to their stores' NER and internally reported demographics. Multivariate regression analysis will be performed to model association between survey responses and NERs. **Results:** In progress. **Implications/conclusions:** Upon determination of attitudes and behaviors towards MTM, additional insight may be discovered pertaining to the pharmacy technicians' role in MTM services, with the final goal being increased successful incorporation of these services into the community pharmacy workflow.

Learning Objectives:

Describe roles for pharmacy technicians in the delivery of MTM services
Discuss how the Theory of Planned Behavior can help identify information regarding pharmacy technicians' behavior and attitudes towards involvement in MTM services

Self Assessment Questions:

Barriers to MTM delivery that could be addressed by involving pharmacy technicians to assist with MTM services include:

- A Difficulty identifying treatment options
- B: Not having sufficient time
- C: Issues with technology
- D: Trouble creating prescriber recommendations

Which of the following is a construct in the Theory of Planned Behavior?

- A Behavior
- B Objective norm
- C Intent
- D Motivation

Q1 Answer: B Q2 Answer: C

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IMPACT OF ORAL MIDODRINE ON DURATION OF INTRAVENOUS VASOPRESSOR THERAPY

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Purpose: Persistent hypotension poses a significant barrier to intensive care unit (ICU) discharge. Management often includes intravenous (IV) vasopressor therapy which necessitates the use of a central line, along with administration within the ICU. Midodrine, an α 1-adrenergic receptor agonist, may be used as an oral alternative to IV vasopressors to minimize adverse events associated with IV administration and promote ICU discharge. While limited studies show shortened IV vasopressor duration with concomitant midodrine therapy, there are conflicting results on ICU length of stay and readmissions. The purpose of this study is to compare the duration of IV vasopressor administration in patients who did or did not receive oral midodrine. The secondary objectives are to compare duration of IV vasopressor administration in patients who did or did not receive oral midodrine stratified according to a baseline predisposition to hypotension; incidence of IV vasopressor re-initiation during ICU stay; rate of ICU readmission; differences in ICU and hospital lengths of stay; and adverse events. **Methods:** A non-interventional medical chart review will be conducted from September 1, 2013 to September 1, 2016. Patients 18 years of age and older admitted to the medical ICU or surgical ICU with a diagnosis of shock requiring at least 24 hours of IV vasopressors will be included. Patients will be excluded if midodrine was used for an indication other than IV vasopressor weaning or if patients were on chronic midodrine therapy prior to hospital admission. Data collected will include patient demographics, vasopressor agents used, dosages of vasopressor agents, ICU readmission, ICU length of stay, hospital length of stay, and adverse events (heart rate and serum lactate). The starting dose, maximum dose, and duration of midodrine therapy will be collected for the midodrine cohort. **Results and Conclusions:** Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review midodrine pharmacology and indications.

Explain the rationale for use of an oral agent to facilitate ICU discharge for patients on vasopressors.

Self Assessment Questions:

Potential benefits of midodrine use in the weaning of vasopressors may include:

- A Increased ICU length of stay and resource utilization
- B Reduced ICU length of stay and resource utilization
- C Increased length of vasopressor therapy
- D Reduced risk of bradycardia

Which of the following statements is FALSE:

- A Midodrine acts as an α 1-adrenergic receptor agonist.
- B Bradycardia and supine hypertension are potential adverse events
- C Midodrine is approved for use in orthostatic hypotension, preventic
- D Midodrine is a prodrug that raises blood pressure in a dose-depen

Q1 Answer: B Q2 Answer: C

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CLINICAL OUTCOMES FOR CLOSTRIDIUM DIFFICILE-ASSOCIATED DIARRHEA: FIDAXOMICIN, METRONIDAZOLE AND VANCOMYCIN

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Purpose: Clostridium difficile infections (CDIs) are one of the most difficult challenges in the current healthcare landscape, leading to increased costs for patients and hospitals alike. In 2011, there were nearly 500,000 cases of CDI in the US, with the majority of these cases being hospital-acquired infections. Currently, the Infectious Disease Society of America's guidelines only recommend treatments consisting of metronidazole and oral vancomycin. Recent publications have expressed positive findings, in terms of cost and efficacy, for fidaxomicin. St. Elizabeth Healthcare is currently confronted with above-average rates of CDI. This study was designed to determine the rates of CDI readmissions for fidaxomicin and non-fidaxomicin containing therapy groups at 30, 60, 90 day intervals following hospital discharge, as well as to determine if the therapeutic benefits of fidaxomicin outweigh the direct cost. **Methods:** This is a retrospective chart review that has been approved by the Institutional Review Board. Patient charts utilized were pulled from January 2013 to December 2015. Patients were included with positive CDI diagnosis, >18 years of age, and if they utilized fidaxomicin or vancomycin based therapies with or without metronidazole. Other points of interest collected will include patient demographics, CDI new diagnosis or recurrence, PCR results, use of concomitant antibiotics, vancomycin dose and frequency used, treatment durations, length of stay, PPI use, and if rifaximin or rectal vancomycin was used. Due to significantly fewer patients receiving fidaxomicin, treatment groups were randomized to equal sized groups of patients, based on total patients in fidaxomicin groupings. All data will be analyzed for average rates of readmission for all treatment groups, with a focus on fidaxomicin containing groups versus non-fidaxomicin containing groups. **Results and Conclusions:** Data collection is complete. Final results will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss current guideline-driven therapy and its effect on fidaxomicin usage

Recognize the financial ramifications associated with Clostridium difficile Infections

Self Assessment Questions:

Which of the following agents (or combination of agents) is the first-line therapy for second recurrence of CDI? (Per IDSA)

- A Fidaxomicin for 10 days
- B Oral vancomycin and oral metronidazole for 10 days each
- C Intravenous metronidazole for 10 days in addition to a tapered reg
- D Intravenous metronidazole for 14 days

Which of the following is a risk factor for contracting a CDI?

- A Bmi <20
- B Stress Ulcer Prophylaxis
- C Fluroquinolone Intolerance
- D Male gender

Q1 Answer: C Q2 Answer: B

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DETECTING OPIOID-RELATED ADVERSE EVENTS USING TRIGGER TOOLS TO MINE AN ENTERPRISE DATA WAREHOUSE AT A LARGE ACADEMIC MEDICAL CENTER

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Purpose: In 2004, the Institute for Healthcare Improvement developed an Adverse Drug Event (ADE) trigger tool to identify ADEs. "Trigger tools" may include laboratory results, antidote administration, and vital signs that can identify potential ADEs. Another way to measure ADEs and errors is through voluntary reporting, but this method can be unreliable due to underreporting, variability in terminology used, and omission of information. Hospital monitoring of ADEs is required by The Joint Commission in order to identify process gaps and develop improvement strategies. This study will focus on opioid-related respiratory depression, which is a serious ADE of narcotic drugs. Some triggers used to identify narcotic overuse and ADEs are naloxone administration and respiratory rate, although historically naloxone administration alone has been utilized. The primary purpose of this study is to compare the positive predictive value (PPV) of two trigger tools for capturing opioid-related ADEs. **Methods:** The study is being conducted as a component of NU IRB STU00022017 Northwestern Memorial Hospital P&T Committee Drug Therapy Quality Assurance Activities Database. The following criteria will be used to mine the Enterprise Data Warehouse (EDW) for narcotic-related ADEs occurring from December 15, 2015 through December 15, 2016: naloxone administration, and naloxone administration plus additional trigger criteria such as respiratory rate <10 breaths per minute and oxygen saturation <90%. Patients who received naloxone doses in the emergency department, the combination drug buprenorphine/naloxone, or oral naloxone will be excluded. Two reviewers will manually confirm the events via chart review to determine the positive predictive value (PPV) of the criteria. The number of true events based on manual review of EDW data will be compared to over-sedation events reported in Northwestern Medicines voluntary reporting system, NETS.

Results/Conclusions: Results and conclusions are in progress and will be presented at the 2017 Great Lakes Pharmacy Residency Conference

Learning Objectives:

Identify potential trigger tools that can be utilized to capture adverse drug events.

Define the meaning of positive predictive value and how it relates to the evaluation of screening tools

Self Assessment Questions:

Which of the following is LEAST likely to be an example of an efficient trigger tool?

- A: Inr > 6
- B: The phrase "opioid overdose" in clinical notes
- C: Administration of the drug flumazenil
- D: Blood glucose levels < 65

A positive predictive value is:

- A: The rate at which a screening tool and exclude false positives.
- B: A measurement of both sensitivity and specificity for a given screen
- C: The probability that subjects that were tested positive by a screen
- D: The number of true positives generated by the screening tool.

Q1 Answer: B Q2 Answer: C

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DEVELOPING A PROFESSIONAL DEVELOPMENT PROGRAM FOR PHARMACY TECHNICIANS WITHIN A HEALTH SYSTEM

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NorthShore University HealthSystem, Highland Park Hospital, 777 Park Avenue Highland Park, IL 60035 Phone number (office): 847-926-5885 Email: caiwohi@northshore.org **Purpose:** Pharmacy technicians are vital members of the pharmacy department. They are responsible for many of the day-to-day tasks that allow the pharmacy to run efficiently. The roles of the pharmacy technician are evolving and have expanded to include tasks such as managing inventories, reconciling medications, compounding, managing information technology, and obtaining and documenting patients medication histories. The expanding roles of pharmacy technicians can be further enhanced with continuing education (CE), which allows pharmacy professionals to continue to develop their competence, problem-solving skills, and critical-thinking skills. This ensures that patients will receive optimal care that is both efficient and safe. The goal of this project is to develop a professional development program for pharmacy technicians in order to facilitate the perpetual professional growth of pharmacy technicians within a health system. **Methods:** This is a quality improvement evaluation and does not require approval from the Institutional Review Board. An initial survey will be sent out to pharmacy technicians to assess how they gain their CE credits, the topics that they are interested in, and the types of presentations that will present CE materials in the most efficient manner. After the data is gathered from the initial survey, programs will be developed and presented to the pharmacy technicians within this institution, with the help of a taskforce. Surveys will be given after presentations to assess pharmacy technician satisfaction. These surveys will then be assessed and used to develop a plan for continuing the pharmacy technician development program. **Results and Conclusions:** Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize the requirements for renewing pharmacy technician certification.

Describe the benefits of continuing education for pharmacy professionals.

Self Assessment Questions:

How many CE hours are required by the Pharmacy Technician Certification Board (PTCB) for pharmacy technician certification renewal

- A: 10
- B: 15
- C: 20
- D: 35

What are the benefits of CE for pharmacy professionals?

- A: Promotes competence, critical thinking, and problem solving that
- B: Allows pharmacy technicians to take on more roles so that pharm
- C: Inhibits the advancement of the pharmacy profession.
- D: Creates minimal professional growth and allows personnel to main

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-738L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EFFECT OF HIGH-DOSE ERGOCALCIFEROL ON RATE OF FALLS IN A COMMUNITY-DWELLING, VETERAN POPULATION: A CASE-CROSSOVER STUDY.

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Background: Previous research has identified a benefit associated with vitamin D supplementation on risk and rate of falls in advanced age. Recent evidence suggests a negative impact of high-dose vitamin D3 supplementation on the same measures. At this time, there is scarce literature available describing fall outcomes related to high-dose ergocalciferol supplementation. The purpose of this study was to evaluate the effect of high-dose ergocalciferol on rate of falls in a community-dwelling, veteran population with low 25-hydroxy vitamin D [25(OH)D]. **Methods:** This single-center, retrospective chart review was conducted at the Lexington Veterans Affairs Medical Center and approved by the Institutional Review Board. Patients who were enrolled in home-based primary care (HBPC), were at least 65 years of age, had a 25(OH)D level less than 20 ng/mL, and subsequently were prescribed high-dose ergocalciferol between March 1, 2005, and September 30, 2016, were included. Those who were enrolled in HBPC less than 60 days prior to or following ergocalciferol prescribing and those with chronic conditions that inherently increase fall risk were excluded. Data collected included age, sex, 25(OH)D levels, vitamin D prescription data total falls, and number of actively prescribed medications that increase fall risk, as described by the 2015 Beers Criteria. The primary outcome measure was a change in rate of falls between the 60-day time periods prior to and upon initiation of supplementation. The secondary outcome was the rate of falls according to the 25(OH)D level achieved as a result of supplementation in those patients who achieved a minimum 25(OH)D level of 30 ng/mL. Numerical variables were compared using a Student's t test with patients serving as their own controls in a case-crossover study design. **Results/Conclusions:** Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recall the minimum dose of vitamin D supplementation recommended for community dwelling, older adults shown to reduce the risk of fractures and falls.

Restate the recommended minimum 25-hydroxy vitamin D concentration goal for older adults.

Self Assessment Questions:

Clinicians are strongly advised by the American Geriatric Society to recommend vitamin D supplementation of at least _____ international units/day to community-dwelling, older adults.

- A: 600
- B: 800
- C: 1,000
- D: 1,200

According to the American Geriatric Society, what is the minimum 25-hydroxy vitamin D concentration goal to achieve in older adults?

- A: 20 ng/mL
- B: 27 ng/mL
- C: 30 ng/mL
- D: 35 ng/mL

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-687L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EFFECT OF A TRANSITIONS OF CARE MEDICATION COVERAGE SERVICE ON PATIENT OUTCOMES

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Transitions of care is an increasingly important area of pharmacy practice. One example is a medication coverage service that decreases the significant medication barriers of cost and access. Our institution's medication coverage service started as a pilot project in 2011 to verify medication coverage before patient discharge. Since that time, the service has grown to include three technicians who determine patient copays, submit prior authorizations and provide access to copay assistance programs. Providers of patients prescribed medications with high copays or those commonly requiring prior authorizations initiate the service. This is a single-center retrospective cohort study to determine the impact of a transitions of care medication coverage service. Our primary hypothesis is that patients will have increased adherence and thus improved outcomes as a result of the service. We also hypothesize that patients receiving the service will have fewer hospital readmissions, less provider follow-up time and smaller copay amounts. The study results will quantify the benefits of the service and allow continued service expansion. Patients included will be those receiving dabigatran (Pradaxa), rivaroxaban (Xarelto), apixaban (Eliquis), edoxaban (Savaysa), enoxaparin (Lovenox), prasugrel (Effient), ticagrelor (Brilinta), sacubitril/valsartan (Entresto), ivabradine (Corlanor), or rosuvastatin (Crestor) for the first time during hospital admission and subsequently discharged on the medication between June 2014 and December 2016. The study will compare patients who received the transitions of care medication coverage service and those who did not for each of the study medications. Baseline characteristics, treatment intervention and outcomes data will be collected for each patient and analyzed. The objective is to determine the impact of a transitions of care medication coverage service on medication adherence, provider follow-up time, copay costs and hospital readmissions. The study has been approved by the Institutional Review Board. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review the current literature regarding transitions of care, medication adherence and medication costs

Describe the current transitions of care medication coverage service

Self Assessment Questions:

Which of the following are examples of transition of care models currently being used throughout the country?

- A: The Better Outcomes for Older Adults Through Safe Transitions (BOAT)
- B: The Transitions of Care Model (TCM)
- C: The Guided Care Model
- D: All of the above

Which of the following aspects of the transitions of care medication coverage service are impacted by pharmacists?

- A: Identifying patients prescribed medications with a high copay or tier
- B: Identifying patients eligible for copay assistance programs
- C: Contacting the transitions of care medication coverage service technician
- D: All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-781L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DE-ESCALATION OF DEXMEDETOMIDINE BASED SEDATION UTILIZING CLONIDINE IN THE MEDICINE AND TRAUMA/SURGERY ICU

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Purpose: The presence of agitation and delirium in critically ill patients is associated with adverse clinical outcomes including longer ICU stay, longer duration of mechanical ventilation, and excessive sedation. The 2013 Society of Critical Care Medicine (SCCM) guidelines for pain, agitation, and delirium (PAD) recommend benzodiazepine-sparing sedation strategy with either propofol or dexmedetomidine to improve clinical outcomes in mechanically ventilated adult ICU patients. Clonidine, an alpha-2 adrenergic agonist, provides similar sedative and analgesic effects seen with dexmedetomidine and may be an ideal alternative agent for sedation. Literature describing the practice of using clonidine to transition patients from dexmedetomidine for sedation management is sparse. Our primary objective is to assess time to dexmedetomidine discontinuation following clonidine initiation for sedation in intubated ICU patients. Secondary objectives are to assess cumulative dexmedetomidine dose, duration of mechanical ventilation, and opioid requirements. **Methods:** This is a single-center retrospective observational cohort study in adult patients ≥ 18 years treated with dexmedetomidine-based sedation for at least 24 hours and admitted to the medical, trauma or surgical ICU at the University of Kentucky Medical Center between January 1, 2005 and June 1, 2016. Patients were excluded if they received guanfacine or a non-enteral form of clonidine during the study period. Drug administration data, Critical Care Pain Observation Tool (CPOT) scores, mechanical ventilation use, and vital signs were collected from our institutions clinical data warehouse from Day 0 (start of dexmedetomidine infusion) to 48 hours after the end of dexmedetomidine infusion. Patient demographics including age, sex, BMI, admitting diagnoses, co-morbidities, home medications, and Sequential Organ Failure Assessment (SOFA) score at time of admission were also collected. **Results and Conclusion:** Data collection and analysis is ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review the adverse clinical outcomes association with agitation and delirium in the ICU.

Recognize the potential utility of clonidine as an ideal alternative non-benzodiazepine agent for sedation in the ICU.

Self Assessment Questions:

Which of the following adverse clinical outcomes are associated with the presence of agitation and delirium in critically ill patients?

- A: Longer ICU stay
- B: Longer duration of mechanical ventilation
- C: Excessive sedation
- D: All of the above

The 2013 SCCM guidelines on pain, agitation, and delirium recommend which of the following agents over benzodiazepines to improve clinical outcomes in mechanically ventilated adult ICU patients?

- A: Propofol
- B: Dexmedetomidine
- C: Ketamine
- D: A and B

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-332L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

THE SAFETY AND EFFICACY OF DIRECT ORAL ANTICOAGULANTS IN PATIENTS WITH ATRIAL FIBRILLATION AND BIOPROSTHETIC HEART VALVES

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Purpose: Due to the low thrombogenic potential of bioprosthetic heart valves, AHA/ACC and CHEST clinical guidelines do not dictate the need for long term oral anticoagulation outside of low-dose aspirin in the absence of other indications for anticoagulation. Therefore, some practitioners consider it reasonable to use Direct Oral Anticoagulants (DOACs) in atrial fibrillation in the presence of bioprosthetic valves despite the lack of data in this population. This use is controversial due to the premature termination of the RE-ALIGN trial, which found increased rates of bleeding and thromboembolic events in patients with mechanical heart valves who were maintained on dabigatran in comparison to warfarin. This prompted a general contraindication for the use of DOACs in patients with prosthetic valves. The goal of this study is to examine the safety and efficacy of DOACs in U.S. Veterans who have atrial fibrillation and bioprosthetic heart valves. **Methods:** In this retrospective cohort study, we examine U.S. Veterans with atrial fibrillation receiving a direct oral anticoagulant (including rivaroxaban, apixaban, dabigatran and edoxaban) between September 2009 and October 2015, and compare those with bioprosthetic heart valves with those with native valves. Veterans with bioprosthetic valves who meet all inclusion criteria will be identified using ICD-9 codes using the Veterans Affairs (VA) corporate data warehouse. Subjects identified will be matched to Veterans with native valves based on demographics and relevant comorbidities. CHA2DS2-VASc stroke risk scores will be calculated and compared. Primary endpoints of this study are rates within 1 year of DOAC initiation for bleeding events, such as intracranial hemorrhage and major gastrointestinal bleeding, and thromboembolic events, such as ischemic stroke or transient ischemic attack. Descriptive statistics will be reported and primary endpoints will be compared via multivariable regression. **Results:** Data is currently being collected and analyzed. **Conclusions:** Study is currently in progress.

Learning Objectives:

Identify risk factors for stroke in atrial fibrillation

Recognize the 2012 CHEST guidelines relating to use of direct oral anticoagulants in patients with bioprosthetic heart valves and atrial fibrillation

Self Assessment Questions:

Which patient has the highest risk for stroke according to the CHA2DS2-VASc scoring system?

- A: 85 yoM with PMH of HLD and BPH who is recently diagnosed with
- B: 55 yoF with PMH of T2DM, PVD, and Afib
- C: 68 yoM with PMH of CVA in 2008, CHF, Afib, and HTN
- D: 74 yoM with PMH of T2DM, hx of NSTEMI in 2005, and Afib

Select the recommendation which coincides with the AHA/ACC and the 2012 CHEST guidelines.

- A: It is reasonable to prescribe long-term low-dose aspirin therapy for
- B: Patients with mechanical AVR should be anticoagulated with a DC
- C: Patients should receive 3 months of warfarin/VKA therapy following
- D: A and C

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-380L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

STRENGTHENING OF PHARMACY CLINICAL SERVICES IN THE NEONATAL INTENSIVE CARE UNIT

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Purpose: To serve as a successful level III neonatal intensive care unit (NICU), it takes a strong multidisciplinary team that encourages learning and growth. In the NICU, our pharmacists currently have a role in standard pharmacy practice and consults for pharmacokinetic services in complex patients. The need for clinically-focused pharmacists is evident in order to maximize the role of pharmacists in this area. When serving as a clinical pharmacist in the NICU, it opens opportunities to have a larger role during rounds, prevent medication errors, optimize medication management, and serve as the medication expert for drug-related questions. **Methods:** To further educate the pharmacists currently working in NICU operations, strategies and tools were developed to enhance their ability to make interventions confidently. Complete and concise medication lists with dosing information were provided to all pharmacists, as well as pertinent pharmacokinetic information. An improved rounding tool was prepared in order to assist the clinical pharmacist during rounds, providing guidance on common interventions that can be made. To provide a standard of practice, a clinical competency program was developed. This program targeted common disease states found in the NICU, as well as patient cases with pharmacokinetics and dosing questions. After all pharmacists who practice in the NICU completed the program, a survey analyzed their confidence in making NICU interventions and recommendations.

Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the most common preventable medication-related errors in the NICU

Explain the unique role of a NICU clinical pharmacist within a multidisciplinary team

Self Assessment Questions:

Which of the following is the most common medication error that is made in the NICU?

- A Incorrect interval
- B Administration error
- C Incorrect dose
- D Incomplete prescription

What is a major targeted intervention(s) for clinical pharmacists in the NICU?

- A Patient-specific optimization of drug therapy
- B Use of evidence-based medicine to increase survival rates and de
- C Perform medication reconciliation and patient counseling
- D A and B

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-749L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF PHARMACIST INTERVENTION OVERNIGHT IN A COMMUNITY HOSPITAL

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Purpose: Incorrect medication histories are the most frequent cause of medication errors during hospitalization. Up to 60% of patients admitted to the hospital will have at least one error in their medication history, and of those patients, 6% will experience a serious adverse event. These errors can cause inappropriate administration of medications during hospitalization, creating a substantial safety risk for patients. Currently at Southwest General Health Center, we employ an emergency department pharmacist from 11:00-23:00, and discharge pharmacists have been finding more errors in patients admitted overnight. Another area that pharmacists influence in the emergency department is the Centers for Medicare and Medicaid Services (CMS) core measures for sepsis, which is important both for patient outcomes and reimbursement. The mortality rate for sepsis ranges from 25-50%, and the time to antibiotics is a significant factor. The purpose of this study is to quantify incorrect medication histories, and analyze pharmacists impact on CMS sepsis bundles. **Methodology:** This quality improvement study was submitted to the Institutional Review Board for approval. A pharmacist will identify patients that have been admitted between the hours of 00:00 and 07:00 via the electronic medical record. A new medication history will be obtained within forty-eight hours of admission. Medication history sources that would not be available at the original time of the medication history will not be included in the analysis. Errors identified will be analyzed using the NCC MERP scale, and specific errors will be noted. Another analysis will be performed that assess CMS core measures for sepsis. These patients are collected at random for quality control, and will be separated into patients admitted to the ED based on times a pharmacist is present. This data will then be analyzed to cost justify the need for twenty-four hour pharmacist coverage. **Results and Conclusion:** To be presented at the 2017 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize the importance of an accurate medication history, and its relationship to patient safety.

Recall the different criteria to reach CMS core measures for sepsis.

Self Assessment Questions:

A 60 yof patient presents to the unit on insulin NPH 15units twice daily. After receiving the medication the patient becomes hypoglycemic and is transferred to the ICU for further monitoring. The patient

- A Category B: An error occurred but the error did not reach the patient
- B Category H: An error occurred that required intervention necessary
- C Category G: An error occurred that may have contributed to or lessened the severity of the outcome
- D Category C: An error occurred that reached the patient but did not

To meet the criteria for the 3-hour sepsis bundle for CMS, which of the following is correct?

- A Obtain a procalcitonin level
- B Administer vancomycin
- C Administer ceftriaxone
- D Administer 20ml/kg crystalloid fluid for hypotension

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-932L05-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF A DIRECT ORAL ANTICOAGULANT MONITORING SERVICE ON APPROPRIATE DOSING, ADHERENCE, AND PATIENT EDUCATION

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Purpose: Anticoagulant therapy options for the prevention of stroke in atrial fibrillation have expanded since 2010 to include four direct oral anticoagulants (DOACs), apixaban, dabigatran, edoxaban, and rivaroxaban. The fixed dosing regimens, lack of coagulation monitoring, and improved safety profile continue to be the main advantages of DOACs over warfarin. However, limited guideline and package insert follow-up recommendations put patients at risk of decreased contact with their healthcare providers and poor adherence. The short half-lives of DOACs make adherence critical to prevent stroke and without efforts to promote adherence, patients may be at risk for poor clinical outcomes. In addition, patients who were excluded from the studies may be among the population prescribed these agents, so efficacy and safety results cannot be extrapolated and close monitoring is warranted. The purpose of this study is to determine if pharmacist involvement in DOAC monitoring in a cardiology office positively impacts patient care in terms of appropriate dosing, adherence, and knowledge of therapy.

Methods: This is an observational study of a pharmacy DOAC monitoring service pilot. Patients 18 years of age or older with non-valvular atrial fibrillation initiated on DOACs at Indiana University (IU) Health North Hospital or IU Health Physicians Cardiology office, who continue outpatient follow-up at the Carmel location, will be included. Patients initiated on DOAC therapy prior to January 2016 or referred to the monitoring service, but elect to not participate, will be excluded. The primary endpoints are percent of DOACs dosed appropriately, percent of patients adherent to therapy, and change in patients knowledge of DOAC therapy over time. Secondary endpoints will include incidence of bleeding episodes, clotting events, hospitalizations related to bleeding or clotting, frequency of DOAC interruption or discontinuation, and number of pharmacist interventions. Results and Conclusions Data collection and analysis are ongoing.

Learning Objectives:

Identify patients who are optimal candidates for DOAC therapy.
Discuss the advantages and challenges of DOAC therapy.

Self Assessment Questions:

Which of the following conditions is a contraindication for DOAC therapy

- A: Mechanical heart valve
- B: Non-valvular atrial fibrillation
- C: History of gastrointestinal bleed
- D: Moderate renal dysfunction

Which of the following represents both an advantage and a challenge of DOAC therapy?

- A: Short half-life
- B: Lack of coagulation monitoring
- C: Fixed dosing regimen
- D: All of the above

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-555L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF TARGETED TRANSITION OF CARE (TOC) SERVICES BY CLINICAL PHARMACISTS ON HOSPITAL READMISSIONS

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Purpose: Transition of care (TOC) is defined as the movement of a patient from one setting of care to another. Pharmacists have the ability to provide patient education as well as clarify medication discrepancies during this TOC period. While previous studies have shown conflicting data on the impact of pharmacist intervention on hospital readmission rates, a targeted approach to pharmacist TOC services based on institution-specific trends may be beneficial. The purpose of this study is to identify factors associated with readmission at a community hospital, implement targeted pharmacist TOC services, and evaluate the impact on hospital readmission rates and patient satisfaction. **Methods:** This study is approved by the Institutional Review Board. Adults admitted with an inpatient status and then readmitted within 30 days to Franciscan Health Dyer whose initial admission occurred from May 2016 through July 2016 are eligible for inclusion. Pre-built electronic health record (EHR) reports will be used to identify patients and determine 30-day readmission rates. Using retrospective chart review, data will be collected on the following: patient demographics, insurance provider, past medical history, discharge details, medications, initial discharge diagnosis, readmission diagnosis, cause(s) of readmission, medication history, and if discharge counseling was completed by a pharmacist. ICD-10 codes will be used to determine initial discharge diagnosis as well as subsequent readmission diagnosis. Causes of readmission will be categorized and analyzed for trends to develop a targeted approach to TOC services. After the interventions are made, a comparator group of patients will be identified and impact of services will be assessed. Patient satisfaction will be tracked using HCAHPS scores. **Results/Conclusion:** Data collection and analysis is currently in progress. Results and conclusions will be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

List possible transition of care (TOC) services that can be provided by a pharmacist
Describe the impact of TOC services on 30-day hospital readmission rates based on the current and previous studies

Self Assessment Questions:

Which of the following disease states has the Centers for Medicare and Medicaid Services adopted readmission measures for?

- A: Diabetes mellitus
- B: Heart failure
- C: Hypertension
- D: Urinary tract infection

Which of the following is true in regards to pharmacist-led TOC services

- A: Pharmacists have no impact or role in a patient's TOC
- B: Pharmacists can consistently improve 30-day readmission rates
- C: Pharmacists are the only members on the healthcare team who provide TOC services
- D: Pharmacists can play a role in both the admission and discharge process

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-794L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF THE DURATION OF STEROID TAPER AFTER VASOPRESSOR CESSATION IN SEPTIC SHOCK

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Purpose: The Surviving Sepsis Campaign guidelines recommend hydrocortisone in patients with septic shock refractory to fluid resuscitation and vasopressor therapy. Guidelines state hydrocortisone should be tapered off when vasopressor therapy is no longer required. The optimal duration of hydrocortisone taper is currently unknown. This study seeks to investigate the effects of the duration of hydrocortisone taper on 28-day incidence of return to vasopressor support. **Methods:** This retrospective cohort study evaluated patients admitted to the intensive care units (ICU) at Spectrum Health Butterworth and Blodgett campuses in Grand Rapids, MI for septic shock between December 15, 2015 and December 31, 2016. Adult patients included in this study were started on an institutional severe sepsis order-set, treated with dual vasopressor therapy or a high-dose of a single vasopressor for at least an hour, and treated with a minimum of 200 mg of hydrocortisone for at least 24 hours before taper. High-dose vasopressor therapy was defined as norepinephrine or epinephrine greater than or equal to 0.2 mcg/kg/min and dopamine greater than or equal to 10 mcg/kg/min. Patients exposed to an initial total daily dose of 200 mg or greater of hydrocortisone until vasopressor cessation were divided into two groups: those tapered off over three or fewer days and those tapered off over greater than three days. The primary outcome of this study was incidence of vasopressor resumption, defined as restarting vasopressor support either during hydrocortisone taper or within 28 days of initial withdrawal. Secondary outcomes include hospital and ICU length of stay, incidence of mortality, duration of hydrocortisone exposure, cumulative hydrocortisone dose, and duration of vasopressor use.

Results/Conclusions: Results and conclusions will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the role of corticosteroids in septic shock.

Identify potential side effects associated with the use of hydrocortisone.

Self Assessment Questions:

What is the role of adjunctive therapy with corticosteroids in septic shock?

- A: The use of corticosteroids in septic shock has been associated with improved outcomes.
- B: The use of corticosteroids in septic shock has been associated with increased mortality.
- C: Only patients with relative adrenal insufficiency have demonstrated benefit.
- D: All the above are true.

Which of the following is a common acute side effect of hydrocortisone use?

- A: Hyperglycemia
- B: Hypertension
- C: Gastrointestinal bleeding
- D: Secondary infections

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-670L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

INCIDENCE OF NEPHROTOXICITY IN TRAUMA PATIENTS RECEIVING VANCOMYCIN WITH EITHER CEFTAZIDIME OR PIPERACILLIN-TAZOBACTAM

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Purpose: Recent studies have shown that the combination of vancomycin and piperacillin/tazobactam significantly increases the risk of developing nephrotoxicity compared to alternative antibiotic therapies. While these studies focus on the development of nephrotoxicity in hospitalized populations, data specific to the incidence in the trauma population are lacking, even though trauma patients carry a greater risk for developing acute kidney injuries due to the nature of their illnesses. The treatment of their traumatic injuries combined with additional comorbidities may expose trauma patients to a higher risk of developing nephrotoxicity with empiric combination antibiotic therapy. The purpose of this study was to compare the incidence of vancomycin-associated nephrotoxicity in trauma patients at Sparrow Hospital who received a combination antibiotic regimen of vancomycin and either ceftazidime or piperacillin/tazobactam. **Methods:** This retrospective chart review evaluated patients admitted to the inpatient trauma service, who were started on vancomycin and one of the other qualifying antibiotics within twenty-four hours of each other for any indication and received at least forty-eight consecutive hours of combination therapy. Patients were not included in the study if they had underlying renal insufficiency or were using concurrent nephrotoxic agents. For the purpose of this study, nephrotoxicity was defined as an increase in serum creatinine of > 0.5 mg/dL or 50% above baseline, whichever was greater, lasting for at least two consecutive days, based on a patient's highest measured serum creatinine value within a period from forty-eight hours after initiating combination antibiotic therapy to seventy-two hours after discontinuing this treatment. Other required data collected from study patients included demographic information, indication for and duration of combination antibiotic therapy, location and length of hospital stay, pertinent labs, details of contrast dye use, and RIFLE criteria. **Summary/Conclusions:** Results will be presented at the 2017 Great Lakes Residency Conference, pending further data collection and analysis.

Learning Objectives:

Describe the proposed mechanism for vancomycin-associated nephrotoxicity.

Identify differences in the rates of nephrotoxicity when various beta-lactams are combined with vancomycin.

Self Assessment Questions:

Vancomycin-associated nephrotoxicity is believed to be caused by which of the following mechanisms?

- A: Acute interstitial nephritis due to oxidative stress caused by renal tubular damage.
- B: Tubular cell toxicity due to interstitial fibrosis caused by crystal deposition.
- C: Glomerulonephritis due to increased intraglomerular pressure caused by immune complex deposition.
- D: Microangiopathy due to altered renal hemodynamics caused by direct tubular toxicity.

Which beta-lactam is proposed to cause the highest rate of nephrotoxicity when combined with vancomycin?

- A: Meropenem
- B: Ceftazidime
- C: Piperacillin/Tazobactam
- D: Cefepime

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-565L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF REPORTED BETA-LACTAM ALLERGY ON INPATIENT OUTCOMES

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Appropriate allergy documentation and reaction verification is essential prior to selecting antimicrobial therapy in patients reporting a beta-lactam allergy. The Infectious Diseases Society of America recommends beta-lactam antibiotics as first-line empiric treatment when Gram-negative coverage is needed for many infectious syndromes. Absent from these guidelines are therapeutic recommendations for empiric treatment options in patients with a beta-lactam allergy. Recent studies of patients with reported antibiotic allergies show that use of alternative antibiotics may lead to treatment that is clinically inferior to first line beta-lactam therapy. In addition to the potential for less effective treatment of the primary infection, second line agents may expose patients to greater risk of NAP-1 Clostridium difficile infections, increased length of stay, increased costs, and risk of resistant infections. The purpose of this study is to determine the proportion of patients with reported beta-lactam allergies who experience a treatment-related adverse event. This will be an observational, retrospective cohort study of patients with a reported beta-lactam allergy who received a non-beta-lactam antibiotic for a suspected or proven infectious disease at Northwestern Memorial Hospital for which a beta-lactam antibiotic is recommended per empiric guidelines. Patients 18 years of age and older, admitted between 3/1/16 and 6/30/16 who received at least 24 hours of an antibiotic will be included. Patients will be excluded from the study if their antibiotic indication is related to prophylaxis or if they are pregnant. The primary outcome will be a composite of the following likely treatment related adverse effects: acute kidney injury, Clostridium difficile infection, attributable antibiotic reactions while on treatment requiring discontinuation, and readmission within 30 days with the same infection. Secondary outcomes include antibiotic cost and inpatient mortality. This study has been IRB approved by Northwestern University

Learning Objectives:

Describe the potential consequences associated with using alternative antibiotics in patients allergic to beta-lactams.

Identify characteristics of a true IgE-mediated reaction and explain possible reasons for such a low rate of true "Allergy" to penicillin in patients reporting a history.

Self Assessment Questions:

Which of the following is not associated with using alternative antibiotics in patients allergic to beta-lactams?

- A Increased rate of NAP-1 Clostridium difficile infections
- B Decreased length of stay
- C Increased costs
- D Increased risk of antimicrobial resistant infections

Which of the following is a possible reason for such a low rate of true "Allergy" to penicillin in those claiming the allergy?

- A A patient's penicillin allergy and specific IgE antibodies to penicillin
- B A patient's reaction may have been masked by an adverse reaction
- C A patient used a penicillin skin test which is not a reliable method
- D A patient had a viral or bacterial infection that may have caused the

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-351L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF PHARMACIST-DRIVEN TRANSITIONS OF CARE SERVICE FOR PATIENTS AT HIGH RISK FOR READMISSION

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Statement of the purpose: The patients transition from the inpatient to outpatient setting can be error-prone. Multiple studies in the community and hospital setting have proven that pharmacist involvement results in a significant decrease in readmission rates and improved accuracy of medication reconciliation at discharge. Government organizations, such as Medicare, have recognized the need for increased quality in healthcare and have instated a decreased reimbursement structure for hospitals with high rates of patients who are readmitted within 30 days of discharge. Pharmacists are in a strong position as medication experts to address this need and convey important information to patients and caregivers. Statement of the methods: The purpose of this retrospective cohort study is to determine the impact of an inpatient pharmacist-led transitions of care service on 30-day hospital readmission rates for high-risk patients. High-risk patients include those with a primary discharge diagnosis of coronary artery bypass graft, acute chronic obstructive pulmonary disease exacerbation, pneumonia, acute myocardial infarction, or congestive heart failure. Data was collected from April 1, 2016 to December 31, 2016 for all patients (n = estimated 1200) with a pharmacist-mediated discharge intervention. Thirty day readmission rates were compared for patients intervened by pharmacists at discharge to those with no pharmacist-mediated discharge intervention. Summary of (preliminary) results to support conclusion: Data collection is ongoing. Conclusions reached:

Conclusions will be assessed once data collection completed.

Learning Objectives:

Recognize five patient populations at high risk for hospital readmission within 30 days post discharge.

Identify key intervention categories pharmacists may influence during medication reconciliation at discharge.

Self Assessment Questions:

Which of the following disease states is most likely to pose a financial risk to the hospital if readmitted within 30 days after discharge?

- A Pancreatitis
- B Acute on chronic congestive heart failure exacerbation
- C Small bowel obstruction
- D Deep vein thrombosis

Which of the following medication intervention categories do pharmacists have the opportunity to influence when completing a medication reconciliation at discharge?

- A Assist with bedside nursing responsibilities to speed up discharge
- B Address dose adjustments and discuss with medical team
- C Determine primary care provider availability for discharge follow-up
- D On the day of discharge, complete all discharge orders for the hospital

Q1 Answer: B Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-938L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PHARMACIST ENGAGEMENT IN CLINICAL SERVICES: THE ROLE OF PERSONALITY CHARACTERISTICS

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Purpose: To (1) describe the distribution of Big Five personality attributes (extraversion, openness to experience, agreeableness, neuroticism, conscientiousness) across various pharmacy practice settings (i.e. community, ambulatory, and inpatient pharmacy), and (2) examine the relationship between each of the Big Five personality attributes and (a) professional engagement, (b) clinical engagement, and (c) work engagement. **Methods Used:** A cross-sectional survey will be administered to licensed pharmacists residing in Midwestern states. The online survey instrument will be distributed by state pharmacy associations via email addresses with a goal sample size of 200. The survey will remain open for six weeks, and a reminder email will be sent at weeks two, four, and six. This study is IRB-approved and the survey was piloted by practicing pharmacists. The survey instrument will consist of five sections: 1) demographics, 2) clinical engagement, 3) professional engagement, 4) work engagement, and 5) personality. The demographics section will include both participant and practice site demographics (e.g. pharmacy setting, prescription volume). Work engagement will be measured using the Utrecht Work Engagement Scale (UWES), and personality will be measured using the Big Five Inventory (BFI). Clinical and professional engagement will be measured with newly developed survey scales adapted from previous studies. Descriptive statistics will be conducted on each of the BFI personality attributes. Structural equation modeling will be used to describe the relationships between personality characteristics and each aspect of engagement. **Results Summary:** The results of this study are currently pending. **Conclusions:** Although a large amount of work has been devoted to advancing pharmacist services, the successful diffusion of these clinical services into widespread practice is an ongoing challenge. Very little literature is devoted to understanding personal characteristics that influence pharmacist engagement, and data from this study can be used to create interventions facilitating pharmacist engagement in clinical services.

Learning Objectives:

Describe the distribution of Big Five personality attributes among pharmacists.

Discuss the distribution of Big Five personality attributes across various pharmacy practice settings.

Self Assessment Questions:

Which of the following is a dimension of the Big Five Inventory?

- A Extraversion
- B: Charisma
- C: Personality
- D: Despair

Which of the following types of engagement have a standardized quantitative instrument?

- A Professional Engagement
- B Clinical Engagement
- C Work Engagement
- D Pharmacist Engagement

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-727L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ASSOCIATION OF PHARMACIST INTERVENTION ON DURATION OF ANTIBIOTIC THERAPY IN PATIENTS WITH NON-INTENSIVE CARE UNIT COMMUNITY ACQUIRED PNEUMONIA: A QUASI-EXPERIMENTAL STUDY

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Purpose: Current literature suggests that antimicrobial stewardship programs can have a significant impact on optimizing therapy and improving outcomes for common disease states, such as community-acquired pneumonia (CAP). The antimicrobial stewardship team at Munson Medical Center (MMC) currently performs prospective audit and feedback on patients receiving broad-spectrum antibiotics, but does not target pneumonia patients specifically. The primary objective of this study was to determine if pharmacist intervention decreases length of antibiotic therapy in patients with non-intensive care unit (ICU) CAP at MMC. **Methods:** This study was a quasi-experimental chart review of patients with a diagnosis of pneumonia who presented to MMC from November 2015 to March 2017. The intervention period started in November 2016. Retrospective data were collected by a nurse data specialist as a part of the Michigan Hospital Medicine Safety Consortium Antimicrobial Use Pilot Program. Patients with an admitting diagnosis of pneumonia were included. Patients were excluded for the following reasons: admission to an ICU, less than eighteen years of age, CD4 count less than 200 cells/mm³, neutropenia as defined as absolute neutrophil count <0.5, or status post-transplant. For the prospective arm of the study, a pharmacist associated with the antimicrobial stewardship team made recommendations to the primary provider in regards to the antimicrobial agent and duration of therapy. The primary outcome of this study was to determine if patients who received pharmacist intervention have a decreased duration of therapy compared to the retrospective control group. Secondary outcomes include concordance with the 2007 Infectious Diseases Society of America (IDSA) CAP guidelines, Clostridium difficile infection rates, thirty day readmission rate, median length of hospital stay, and in-hospital mortality. **Results:** Initial results and conclusions will be presented at the 2017 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify the appropriate duration of therapy for non-intensive care unit community acquired pneumonia based on patient-specific factors.

Describe the association of a pharmacist's intervention on antibiotic duration of therapy for non-intensive care unit community acquired pneumonia patients.

Self Assessment Questions:

According to the 2007 Infectious Diseases Society of America community acquired pneumonia guidelines, which of the following is the most appropriate duration of antibiotic therapy for a patient with n

- A 5 days
- B: 8 days
- C: 10 days
- D: 14 days

Based on current studies regarding pharmacist intervention in community acquired pneumonia, which of the following is most true?

- A Pharmacist intervention increases duration of antibiotic therapy
- B Pharmacist intervention decreases duration of antibiotic therapy
- C Pharmacist intervention makes no difference on duration of antibiotic
- D Pharmacist intervention increases duration of intravenous antibiotic

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-545L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ASSESSMENT OF SELECT COMPONENTS OF CMS CORE MEASURE COMPLIANCE IN PATIENTS WITH MALIGNANCY AND NEUTROPENIC SEPSIS

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Background: Patients with cancer are a fragile population that require special care. They are at an increased risk for infection due to reduced immune system functioning. These patients often receive cytotoxic therapies as the mainstay of treatment which produce harmful adverse effects. Bone marrow suppression is a limitation of cytotoxic drugs leading to neutropenia which predisposes patients to life-threatening infections. Patients with cancer presenting with neutropenic sepsis are at an increased risk of mortality. Therefore, it is important for all health-systems to follow best practices in order to help treat patients with sepsis effectively. The Centers for Medicare and Medicaid Services (CMS) has outlined core measures or best practices for patients that are diagnosed with severe sepsis and septic shock. Identifying potential barriers to best practices will ultimately improve outcomes in patients with febrile neutropenia presenting with severe sepsis or septic shock. Measuring compliance of select components of the core measure set forth by CMS will enable Cleveland Clinic Akron General (CCAG) to better serve patients in the community. **Methods:** This is a retrospective single center cohort study measuring compliance of empiric antibiotic administration in patients with cancer and febrile neutropenia presenting with severe sepsis or septic shock. Patients with a cancer diagnosis, febrile neutropenia, and concurrent severe sepsis or septic shock admitted to CCAG from January 2010 to November 2016 will be included in this study. The primary objective of this study is to report the proportion of patients with cancer and febrile neutropenia receiving empiric antibiotics within the CMS defined timeframe for treatment of severe sepsis and septic shock. Secondary objectives include identifying predictors of CMS compliant empiric antibiotic treatment and assessing compliance or non-compliance for select components of the CMS core measure for severe sepsis or septic shock. **Results and conclusions:** Reported upon completion.

Learning Objectives:

Recognize the importance for hospitals to follow best practices in order to help treat patients with severe sepsis or septic shock in a timely and efficient manner.

Identify the most probable cause for neutropenia and immunosuppression in patients with an oncologic diagnosis.

Self Assessment Questions:

The Centers for Medicare and Medicaid Services currently recommends which of the following for patients with severe sepsis or septic shock?

- A Administration of antibiotics less than 3 hours from the time of diagnosis
- B Fluid administration for patients who are hypertensive in less than 3 hours
- C Administration of antibiotics less than 6 hours from the time of diagnosis
- D A diagnosis of severe sepsis or septic shock less than 3 hours from diagnosis

Patients with an oncologic diagnosis most often present with neutropenia and immunosuppression because of which of the following?

- A Extended hospital stays
- B Cytotoxic agents
- C Antibiotic usage
- D Gender

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-366L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

THE TRANSITION TO ANTIFACTOR XA LEVEL FOR MONITORING UNFRACTIONATED HEPARIN

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Purpose: Unfractionated heparin (UFH) is an anticoagulant that is utilized for treatment of venous thromboembolism and acute coronary syndrome. The optimal approach to heparin monitoring is unknown. Monitoring either activated partial thromboplastin time (aPTT) or heparin antifactor Xa levels has been both proposed as options in the medical literature and per recent guidelines. The aPTT has been traditionally utilized for monitoring UFH primarily because of availability, familiarity, and cost relative to antifactor Xa. Previous studies have demonstrated that a good correlation exists between antifactor Xa levels and heparin concentrations. Compared to aPTT, antifactor Xa monitoring is associated with fewer heparin dosing adjustments and blood draws. In September, 2016, University of Kentucky HealthCare Hospitals implemented the use of antifactor Xa as a standard monitoring parameter for UFH management. The purpose of this study is to compare antifactor Xa level to aPTT as the primary monitoring parameter for UFH. The primary outcome is the percentage of patients achieved therapeutic range within 24 hours of UFH initiation. Secondary outcomes include the percentage of patients achieved therapeutic range within 48 hours of UFH initiation, number of infusion rate changes, number of lab tests performed, and number of bleeding or thrombosis incidents during UFH therapy. **Methods:** A retrospective chart review included patients 18 years of age or older who receive UFH infusion at UK HealthCare hospitals for 3 months before and after initiation to antifactor Xa level monitoring. Categorical data will be analyzed using the Chi-square test, while a student's t test will be used to analyze continuous variables with an alpha significance level of 5%. **Results and conclusions:** Preliminary results showed significant differences in the percentage of patients achieved therapeutic level within 24 hours and 48 hours of heparin initiation. Final results and conclusion are pending completion of data analysis.

Learning Objectives:

Discuss current guideline recommendations and alternative monitoring parameters for UFH management.

Recognize the clinical outcomes of utilizing antifactor Xa in UFH infusion monitoring.

Self Assessment Questions:

What is a recommended therapeutic heparin level by antifactor Xa analysis for standard heparin protocol?

- A 0.3 – 0.7
- B 0.5 – 1.1
- C 0.8 – 1.0
- D 1.1 – 2.0

What are advantages of using antifactor Xa levels to monitor unfractionated heparin?

- A Average time to therapeutic level is faster.
- B Lab reagent cost is less expensive.
- C The heparin antifactor Xa level is less impacted by biologic variability.
- D A and C

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-476L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION AND UTILIZATION OF ORDER SET FOR EARLY ONSET SEPSIS AIMS TO IMPROVE ANTIBIOTIC UTILIZATION RATES IN NEONATES

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Purpose: The Vermont Oxford Network (VON) is a national nonprofit voluntary collaboration of Neonatal Intensive Care Unit (NICU) healthcare professionals. NICU pharmacists are involved in the VON initiative at St. Joseph Hospital by monitoring antimicrobial usage for Early Onset Sepsis (EOS) and safely discontinuing therapy based on physician delegation at 36 to 48 hours. With the implementation of an electronic medical record, there remain opportunities for NICU pharmacists to become more involved in antimicrobial stewardship practices and reduce the duration of antimicrobial therapy for EOS to 24 to 36 hours. An admission order set was created prior to the start of this study to help physicians order all the necessary therapies for NICU admissions, including commonly utilized antimicrobials for EOS. The purpose of this study is to improve antimicrobial stewardship in the NICU, by providing pharmacist-driven education and prospective feedback to physicians regarding use of the NICU admission order set to establish appropriate durations of therapy for EOS antimicrobial regimens. **Methods:** Study was approved by Institutional Review Board. Education will be provided to physicians on the utilization of the NICU admission order set. Data will be collected pre and post education. Pre intervention data will be collected from September to December 2016. The primary outcome is increased utilization of the NICU admission order set by 5 percent. The secondary outcome is reducing antimicrobial days of therapy (DOT) by five percent.

Results and Conclusion: 65 patients met screening criteria for data analysis. Prior to the order set intervention, the NICU admission order set was used approximately 69 percent. Initial evaluation of September to December 2016 DOT shows an average of 5.05. This includes patients who started on antimicrobial therapy for EOS and continued for a specified duration. The conclusion and post intervention results will be presented at Great Lakes Resident Conference.

Learning Objectives:

Identify common organisms that cause EOS in the neonatal population. Describe the relationship between time to positivity for blood cultures and antimicrobial duration for EOS.

Self Assessment Questions:

Which of the following is the most common antibiotic combination used to treat neonates for EOS?

- A: Nafcillin / Piperacillin-tazobactam
- B: Vancomycin / Piperacillin-tazobactam
- C: Ampicillin / Gentamicin
- D: Ampicillin-sulbactam / Levofloxacin

The purpose of this project is to attempt to reduce the duration of antimicrobial therapy to what specified time interval?

- A: 72-96 hours
- B: 24-36 hours
- C: 36-48 hours
- D: 12-24 hours

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-664L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

POPULATION-BASED PHARMACOKINETIC MODEL OF POLYMYXIN B IN ADULT CYSTIC FIBROSIS PATIENTS

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Background: Polymyxin B pharmacokinetics in adult cystic fibrosis (CF) patients is not currently well described. **Methods:** CF fibrosis patients treated with PB had plasma peak and trough PK samples measured by LC-MS/MS for clinical care. PK models with nonparametric parameter estimation were constructed and fit to the data in Pmetrics for R. Covariate modifiers considered in the model included: age, TBW, SCr, eGFR, CrCl, Albumin, IBW and BMI. Covariates with a relationship of $p < 0.1$ with the model parameter were further explored. Ultimate retention required significance (i.e. $p < 0.05$) by log-likelihood ratio test between comparative models. Noncompartmental analysis was performed on the Bayesian posteriors from the first dose to generate PK exposure metrics. **Results:** 8 CF patients contributed 24 blood samples for PB assay. Patients received a range of initial doses between 58 and 240 mg of polymyxin B (mean 2.1 mg/kg (StDv 0.75)). A 2-compartment model without covariate adjustment best fit the data (Bayesian model: $R^2 = 0.764$, bias = -0.201 mg/L, and imprecision = 0.842 mg²/L²) and was not better and more parsimonious than the CrCl adjusted Ke model ($p = 0.361$). Population median parameter values (CV%) for Ke, V, KCP, and KPC were: 0.28 h⁻¹ (60.7%), 16.313 L (9.6%), 1.05 h⁻¹ (92.8%), 3.392 h⁻¹ (64.3%), respectively. Non-compartmental analysis of the Bayesian posteriors revealed median T_{1/2}, C_{max}, and AUC_{0-INF} of 5.1 hrs, 4.4 mg/L, and 30.97 mg²/h/L from the first dose. VD was less (16.8 vs. 28.6L, $p = 0.013$) and kel was greater (0.22 vs. 0.09/hrs, $p < 0.001$) in CF than non-CF patients. **Conclusions:** Neither weight nor renal function affected the PK of polymyxin B in adult CF patients, though sample size needs to be increased for a full understanding. Importantly, CF patients displayed different PK parameters than non CF patients receiving polymyxin B, indicating that different dosing strategies may be necessary.

Learning Objectives:

Describe properties of Polymyxin B

Explain importance and significance of pharmacokinetic modeling in utilizing drug therapy and estimated PK parameters

Self Assessment Questions:

Polymyxin B has great activity against this type of bacteria

- A: Gram +
- B: Gram -
- C: Both gram + and gram -
- D: Neither due to resistance

Pharmacokinetic modeling can provide which specific PK parameters

- A: Vd
- B: Ke
- C: Auc
- D: All of the above

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-601L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DIRECT ORAL ANTICOAGULANTS: ASSESSING AFFORDABILITY

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Background: The direct oral anticoagulants (DOACs) apixaban, rivaroxaban, dabigatran, and edoxaban have seen a rise in popularity over the past few years compared to vitamin K antagonists (VKAs). Some advantages that the DOACs have compared to VKAs are the lack of required laboratory monitoring to ensure efficacy, as well as having standardized dosing regimens. Each of the DOACs have some form of copay savings program and/or 30-day free trial, which can make these agents even more appealing to both patients and prescribers. However, even with these coupons DOACs can be considerably more expensive than the VKAs. The objective of this study is to determine if patients are having trouble affording newly prescribed DOACs after being discharged from the hospital. **Methods:** This study is a single-center prospective survey of adult patients newly prescribed a DOAC. The questionnaire assessed whether the patient was already having difficulty affording medications, how concerned they were about the cost of their new medication, whether they've been noncompliant with medications to save money, and what type of insurance they have. There is a follow-up phone call with the patient six weeks after discharge to determine whether the patient is having any trouble paying for their prescription, they are compliant with their medication, follow-up with their provider, any side effects or further questions about their medication. **Conclusion:** Results and conclusion will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify common indications for direct oral anticoagulant therapy.
Recall advantages and disadvantages of direct oral anticoagulant and vitamin K antagonist therapy.

Self Assessment Questions:

Which of the following is an advantage of direct oral anticoagulants when compared to vitamin K antagonists?

- A: Multiple drug-food interactions
- B: Predictable pharmacokinetics
- C: Require regular laboratory monitoring
- D: Do not require renal dose adjustments

Which of the following are approved indications for direct oral anticoagulants?

- A: Deep vein thrombosis
- B: Pulmonary embolism
- C: Valvular atrial fibrillation
- D: Both A & B

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-842L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF THE EMPIRIC USE OF LEVOFLOXACIN IN COMBINATION WITH ANTIPSEUDOMONAL BETA-LACTAMS IN THE TREATMENT OF PNEUMONIA

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Purpose: Prior to 2005 the timeline of pneumonia onset was often used to classify a patient's risk of having an infection caused by hospital-acquired pathogens. This changed with the release of the 2005 Infectious Diseases Society of America/American Thoracic Society pneumonia guidelines, which advised clinicians to consider prior exposure to non-hospital healthcare facilities as a risk factor for multi-drug resistant pathogens, especially *Pseudomonas aeruginosa* and *Staphylococcus aureus*. Furthermore, these guidelines encouraged empiric treatment with two antibacterials active against pseudomonas, based on the assumption that combination therapy increases treatment success and decreases the likelihood for emergence of resistance. Anti-pseudomonal beta-lactams are frequently preferred due to tolerability and efficacy. If desired, aminoglycosides or anti-pseudomonal fluoroquinolones are added. The purpose of this evaluation is to measure the impact the addition of levofloxacin has for patients being treated for nosocomial or healthcare-associated pneumonia.

Methods: The study design is a single-center, retrospective chart review of patients with a primary discharge diagnosis of pneumonia. Patients discharged from January 1, 2014 to September 13, 2016 were included if they received empiric treatment of pneumonia for 48 hours with IV antibiotics active against MRSA and an anti-pseudomonal beta-lactam. Patients were excluded if they did not receive aforementioned antibiotics, were treated with aztreonam, were treated for less than 48 hours, had cystic fibrosis, were diagnosed with viral pneumonia, had an absolute neutrophil count less than 500/mm³, were a prisoner or a minor, or left against medical advice. The primary objective is to determine if a mortality benefit is conferred by the addition of levofloxacin. Secondary objectives include impact on length of stay, 30-day readmission rate, occurrence of post-treatment *Clostridium difficile* infection, and duration of ventilation.

Results/Conclusion: Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss guidelines and primary literature addressing the concept of double gram-negative coverage.
Identify the impact that the addition of a fluoroquinolone to an anti-pseudomonal beta-lactam has on patient outcomes.

Self Assessment Questions:

In which of the following situations is double gram-negative coverage most warranted for the treatment of pneumonia?

- A: A patient with no drug allergies develops a hospital-acquired pneumonia
- B: The patient requires oxygen via nasal cannula
- C: The patient's status worsens while being treated with one anti-pseudomonal beta-lactam
- D: A patient's repeat chest x-ray has not improved since the one taken

Which of the following outcomes would not likely be caused by the addition of a fluoroquinolone to a patient already receiving IV vancomycin and cefepime for the treatment of pneumonia?

- A: Acute kidney injury
- B: *C. difficile* associated diarrhea
- C: QT prolongation
- D: Altered mental status

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-574L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF THE POTENTIAL IMPACT OF A "DARBEOETIN ALFA INDICATION RESTRICTION AND DOSING GUIDELINE" IN AN INPATIENT SETTING

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Purpose: The efficacy of erythropoietin-stimulating agents (ESAs) in increasing red blood cell production and decreasing transfusions for anemia of chronic kidney disease and chemotherapy-induced anemia has been established. Although efficacious, ESAs have several safety concerns including Black Box Warnings for increased risk of thrombosis mortality, and tumor progression. Despite the high risk, ESAs continue to be prescribed outside of labeled indications and hemoglobin parameters. Clinical practice guidelines recommend evaluating iron studies and hemoglobin prior to administration to ensure maximum efficacy and safety of ESA therapy. Additionally, correct dosing of ESAs is important to reduce the risk of adverse effects and minimize cost. At Norton Healthcare, the current process for ESA evaluation by a pharmacist involves formulary interchange to darbepoetin alfa and assessment for appropriate hemoglobin. To ensure appropriate use, maximize efficacy, and mitigate adverse effects, a "Darbepoetin Alfa Indication Restriction and Dosing Guideline" has been developed. The guideline enforces four major checkpoints: indication, iron assessment, dosing, and hemoglobin assessment. The purpose of the study is to evaluate the current use of ESAs and the potential impact of the proposed guideline at Norton Healthcare. **Methods:** This is an IRB-approved retrospective study evaluating adult inpatients who receive one or more doses of darbepoetin alfa between August 1, 2016 and September 15, 2016. Patients who identify as Jehovahs Witness requiring major surgery are excluded. The primary composite outcome is total micrograms of darbepoetin alfa administered in comparison to micrograms administered with guideline application. The micrograms of darbepoetin alfa averted with each of the four guideline components serve as secondary endpoints. **Results and Conclusion:** Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review the appropriate monitoring parameters necessary to mitigate the potential adverse effects of darbepoetin alfa.

Discuss the requirement of adequate iron stores for darbepoetin alfa to be effective.

Self Assessment Questions:

In an effort to reduce adverse drug events, which of the following darbepoetin alfa orders is inappropriate based on indication and monitoring parameters?

- A: Patient with cancer and Hgb of 10g/dL
- B: Patient with ESRD on HD and Hgb of 9g/dL
- C: Patient with known CKD stage IV and Hgb of 8g/dL
- D: Patient with newly diagnosed CKD and Hgb of 12.5g/dL

Which of the criteria listed below is necessary for darbepoetin alfa to effectively stimulate red blood cell production?

- A: Adequate hemoglobin
- B: Deficient red blood cell indices
- C: Adequate iron stores
- D: Deficient iron stores

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-491L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

A COMPARISON OF CUSTOMIZED ANTIMICROBIAL STEWARDSHIP ALERTS BETWEEN AN EXTERNAL CLINICAL DECISION SUPPORT SYSTEM AND A LARGE ELECTRONIC HEALTH RECORD

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Background: Antimicrobial Stewardship (AMS) is a key method for curtailing antibiotic resistance². Prospective audit and feedback (PAF) is a cornerstone of AMS. A powerful tool for facilitating PAF is the use of Clinical Decision Support Systems (CDSS), which can improve guideline adherence, decrease costs, and increase efficiency of data review³⁻⁸. Clinical pharmacists at Cleveland Clinic Health System utilize an external CDSS separate from the electronic health record (EHR). Thirty rules are currently in use, including de-escalation or escalation opportunities, drug interaction monitoring, and adverse drug reaction prevention. These external CDSS rules can be built into the EHR. The present study aims to validate and implement AMS alerts within an EHR to compare sensitivity, specificity, and usability to alerts in the external CDSS. **Objectives:** The primary objective will determine sensitivity and specificity of alerts by comparing number of alerts generated in the external and internal systems by alert type. Secondary objectives measure usability of both systems by measuring the number of clicks necessary to address alerts in either system, number of redundant alerts, and user satisfaction as measured via Likert survey. **Methodology:** This is a pre-post observational study comparing the number and types of alerts generated within the EHR and the external CDSS between February 6th 2017 and March 31st 2017. Alerts in the EHR will be validated to ensure proper functionality, then alerts in both systems will be counted and categorized by type. Discrepancies in number of alerts will be examined for cause. To evaluate usability, nine infectious disease pharmacists will review alerts in the EHR on a rotating basis. The primary outcome will be evaluated via student t-test. The secondary outcomes of redundant alerts and clicks will be evaluated using the student t-test and user satisfaction will be assessed via Mann-Whitney U test. **Results and conclusions:** Pending data collection

Learning Objectives:

Describe the utility of clinical decision support systems

Indicate how clinical decision support system rules may be integrated into an EHR to be used for prospective audit and feedback

Self Assessment Questions:

Which is not a goal of antimicrobial stewardship?

- A: Improve selection of optimal antibiotic agents
- B: Improve selection of optimal antibiotic dosing
- C: Improve selection of optimal antibiotic duration of therapy
- D: All of the above are goals of antimicrobial stewardship

Which of the following have not been shown to be a benefit of using Clinical Decision Support Systems?

- A: Improved adherence to guidelines
- B: Decreased length of stay
- C: Decrease in 30-day readmissions
- D: Decreased costs

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-853L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

COMPARISON OF SAFETY AND EFFICACY OF ENOXAPARIN REGIMENS FOR TREATMENT OF VENOUS THROMBOEMBOLISM IN THE SETTING OF CANCER

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Purpose: The increased risk for venous thromboembolism (VTE), including deep venous thrombosis (DVT), pulmonary embolism (PE), and venous occlusion is linked to cancer. The American College of Chest Physicians CHEST guidelines report an estimated 15% of VTE recurrence at one year follow up. The rate of major bleeding is more than two times higher in patients with cancer receiving anticoagulation therapy. Currently, major guidelines recommend using low molecular weight heparin (LMWH) over oral drugs in patients with cancer for treatment and prevention of thromboembolism. Two therapeutic dosing regimens of enoxaparin are currently approved by the FDA: 1.5 mg/kg once daily and 1 mg/kg twice daily. There is no strong recommendation for one dose over the other and limited trials comparing the two dosing regimens of enoxaparin in patients with active cancer are available. The purpose of this study is to evaluate the safety and efficacy of different dosing regimens of enoxaparin for the treatment of VTE in patients with active cancer at Jesse Brown VA Medical Center. **Methods:** This study is a retrospective, electronic chart review of patients at JBVAMC who had a diagnosis of active cancer, an established diagnosis of VTE and were newly started on long-term enoxaparin (30 days or more) during the period between May 1st, 2012 and March 31st, 2016. Exclusion criteria include patients who received enoxaparin dose 1 mg/kg daily due to renal dose adjustment, were pregnant, or enrolled in hospice during initial fill of enoxaparin. The primary endpoints are occurrence of all bleeding (major and minor) in once daily and twice daily regimens and recurrence of thromboembolism in once daily and twice daily regimens. Secondary endpoints include incidence of major bleeding, minor bleeding, mortality, and the time to endpoints. **Results/Conclusions:** Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the appropriate anticoagulation therapy for patients with active cancer

Discuss the relationship between active cancer and incidence of VTE

Self Assessment Questions:

According to major guidelines, which of the following VTE treatment options is recommended in patients with active cancer?

- A: Vitamin K antagonist
- B: Direct oral anticoagulants
- C: Low molecular weight heparin
- D: No treatment is recommended

Which of the following is/are true regarding patients with active cancer?

- A: Incidence of initial VTE event is increased
- B: Incidence of initial VTE event is decreased
- C: Incidence of recurrent VTE event is decreased
- D: VTE rates are unaffected by cancer

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-345L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION OF AN EXTENDED-INFUSION BETA-LACTAM AUTOMATIC INTERCHANGE PROCEDURE AND EVALUATION OF RELATED CLINICAL OUTCOMES

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Purpose: Current literature supports the use of extended-infusion beta-lactam antibiotics over short-infusion. The amount of time which the free drug concentration exceeds the minimum inhibitory concentration (MIC) of the pathogen is the best predictor of bactericidal activity for beta-lactams. This pharmacokinetic principle is supported by patient outcomes data from large clinical trials demonstrating improvements in mortality, survival, length of stay, and treatment success favoring extended-infusions over intermittent dosing. The purpose of this project is to implement an extended-infusion beta-lactam ordering menu and automatic interchange procedure, provide administration guidelines at a medical center level, and assess the potential impact on patient outcomes. **Methods:** This study is a retrospective, electronic chart review comparing efficacy outcomes of extended-infusion and short-infusion beta-lactams from July 1, 2016 to January 7, 2017. The primary efficacy outcomes analyzed in this study are intensive care unit (ICU) and total hospital length of stay. Secondary outcomes include: time to de-escalation of antibiotics, medication error rate, and cost of antibiotic therapy. Provider documentation in electronic health records, available microbiological cultures, electronic reports of patient's time to floor transfer or discharge, data from error reporting software, and real time drug cost data will be collected for the evaluation of these primary and secondary outcomes. This project will assess the implementation of the following antibiotics as extended infusions: piperacillin/tazobactam, cefepime, and meropenem. **Results/Conclusions:** Results and conclusions will be presented at the 2016 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review the pharmacokinetic principles and drug literature supporting the use of extended-infusion antibiotics.

Identify common barriers to implementation of extended-infusion antibiotics.

Self Assessment Questions:

Which of the following pharmacokinetic principles demonstrates the rationale for administering beta-lactam antibiotics as an extended-infusion?

- A: Area under the curve to minimum inhibitory concentration ratio (AUC/MIC)
- B: Peak concentration to minimum inhibitory concentration ratio (C_{max}/MIC)
- C: Time free drug concentration above minimum inhibitory concentration (T_{free})
- D: Trough concentration below minimum inhibitory concentration (C_{trough})

Which of the following extended-infusion antibiotics is considered y-site incompatible with vancomycin?

- A: Cefepime
- B: Meropenem
- C: Piperacillin/tazobactam
- D: None of the above

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-587L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATING THE IMPACT OF AN OUTPATIENT PHARMACY-BASED MEDICATION BOX SERVICE ON HEALTHCARE UTILIZATION WITHIN AN INTEGRATED HEALTHCARE SYSTEM

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Purpose: The primary objective of this quality assurance project is to evaluate the impact of a comprehensive medication review and assessment (CMRA) combined with a medication box service on healthcare utilization within an integrated healthcare system for high-risk patients identified by a nurse care manager, a primary care clinical pharmacist, or a provider. **Methods:** Patients within an integrated healthcare system who demonstrate high healthcare utilization are identified by a nurse care manager, a primary care clinical pharmacist, or a provider. After identification, patients are offered a pharmacist-led CMRA followed by an opportunity to enroll in the medication box service provided by the outpatient pharmacy. Those who enroll have their medications synchronized, packaged in medication boxes, and delivered to their homes. The goal of the service is to improve adherence with the aim of reducing healthcare utilization variables such as doctor visits, nurse visits, urgent care visits, emergency department visits, hospitalizations, and healthcare metrics such as HbA1c, blood pressures, and lipid panels. Outcomes from eight months pre-enrollment will be compared with outcomes eight months post-enrollment to evaluate the impact on healthcare utilization. **Results:** To be determined. **Conclusions:** This service may decrease healthcare utilization among high-risk patients by increasing medication adherence. Results of this project may support the implementation of medication box services at other outpatient pharmacies within this integrated healthcare system.

Learning Objectives:

Explain the functions of the CMRA and the medication boxes as adherence interventions

Identify the potential value of increasing adherence with the medication box service

Self Assessment Questions:

Which of the following best describes the primary function of the medication boxes in the effort to improve adherence?

- A: Reducing frequency of doses
- B: Organizing medications
- C: Discontinuing unnecessary drugs
- D: Decreasing pill burdens

Which of the following best characterizes the potential benefits of increasing adherence with the SSM Health medication box service?

- A: Increasing healthcare utilization and increasing costs to the health
- B: Increasing healthcare utilization and decreasing costs to the health
- C: Decreasing healthcare utilization and increasing costs to the health
- D: Decreasing healthcare utilization and decreasing costs to the health

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-809L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

CREATING A CULTURE OF CO-PRESCRIBING NALOXONE WITH OPIOIDS

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Purpose: Naloxone has received national attention for its role in heroin overdose but its utility in chronic pain management is often overlooked. Many patients who use opioids for pain have concurrent medications and disease states that put them at increased risk for accidental overdose. Patients who take opioids for chronic pain were identified as an opportunity to improve the safety of their care plan. Likewise, Norton community pharmacies are in a unique position to impact a chronic pain patients treatment plan due to the close proximity of pain management clinics as well as a shared electronic medical record. The purpose of this project is to raise awareness among healthcare professionals of the risk of accidental overdose and create a culture of co-prescribing naloxone with prescription opioids for pain management patients. **Methods:** This process improvement project aims to raise awareness and support a workflow for co-prescribing naloxone with chronic opioid prescriptions by targeting two distinct groups of healthcare professionals, pain management physicians and clinic staff and the community pharmacy staff. Separate in-services were developed and delivered to these groups. Additionally, the pharmacy staff participated in a survey before the in-service to gauge their knowledge and attitudes regarding naloxone and then again after the in-service to measure the change after education. To support the education and workflow for the clinic staff, a pharmacist was assigned to the clinic for two days a week for one month. After one month, the clinic staff completed the survey to assess whether the education and workflow are assimilated into the office culture. Lastly, this project will measure whether tools such as education and providing a pharmacist in a clinic environment are valuable to promoting a new culture of prescribing. **Results/Conclusions:** Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the widespread impact of the opioid use, misuse, and abuse epidemic

Describe strategies to engage various healthcare professionals in creating a culture of co-prescribing naloxone with opioids

Self Assessment Questions:

Which of the following have contributed to a greater public awareness of the opioid epidemic?

- A: Decreased number of opioids being prescribed
- B: 2016 CDC Guidelines for Prescribing Opioids
- C: Black Box Warnings being applied to all opioids
- D: Patients educating themselves via the internet

Which of the following strategies would be the most effective in creating a culture of co-prescribing naloxone with opioids?

- A: In-services given to pain management clinic staff
- B: In-services given to pharmacy staff
- C: A pharmacist working in a clinic environment part time to support
- D: A pharmacist working in a clinic environment full time to support

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-528L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ASSESSING THE IMPACT OF A PREVIOUSLY IMPLEMENTED EMERGENCY DEPARTMENT SEPSIS SCREENING TOOL

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Background: Adequate screening for septic patients is an important consideration due to the high mortality associated with sepsis. The 2012 Surviving Sepsis Campaign guidelines emphasized early recognition of sepsis with the administration of antibiotics within one hour. Since then, an updated 2016 guideline has redefined the criteria for sepsis and septic shock. Another consideration is the importance of antimicrobial stewardship to reduce the development of antimicrobial resistance and severe adverse events such as Clostridium difficile-associated diarrhea. A sepsis screening tool should adequately target septic patients while maintaining specificity to prevent the inappropriate diagnosis of sepsis in patients without a severe infection. In September 2015, an adult sepsis screening tool was implemented for use in Henry Ford Allegiance Health's emergency department with the intent of accomplishing that goal. **Purpose:** The purpose of this study is to determine the impact of the emergency department sepsis screening tool on the diagnosis of sepsis in patients at Henry Ford Allegiance Health. **Methods:** This study is a retrospective chart review. IRB approval was granted. Inclusion criteria were adults who came through the emergency department and screened positive for sepsis. Exclusion criteria were children, prisoners, and direct admissions. The primary outcome is the percentage of patients who are diagnosed with sepsis in the emergency department during the three months before screening tool implementation compared with three months after. Secondary endpoints include culture data, infection source determination, administration of broad spectrum antibiotics, and development of Clostridium difficile-associated diarrhea during hospital stay. Statistical analysis was completed with the help of a statistician. **Results:** In progress. **Conclusion:** In progress

Learning Objectives:

Recognize the components of the three and six hour sepsis bundles provided in the Surviving Sepsis Campaign guidelines.
Identify patients with sepsis and septic shock using the most current definitions.

Self Assessment Questions:

Which of the following should be completed within 3 hours after the diagnosis of sepsis according to the three hour bundle?

- A Start both stress ulcer prophylaxis and thromboembolism prophylaxis
- B Obtain blood cultures prior to antibiotic administration
- C Obtain a basic metabolic panel to assess kidney function
- D Apply vasopressors if required to keep the mean arterial pressure

According to the currently available definition, which patient should be diagnosed with sepsis?

- A A patient who on initial evaluation is found to have a temperature > 38.3°C
- B A patient who on initial evaluation is found to have a systolic blood pressure < 90 mmHg
- C A patient with a baseline SOFA score of 0 who is found to have a new organ dysfunction
- D A patient who is determined to have all 4 SIRS criteria present and at least one organ dysfunction

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-430L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF A CONTINUOUS PROFESSIONAL DEVELOPMENT PROGRAM FOR AMBULATORY CARE CLINICAL PHARMACISTS

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Purpose: Continuous professional development (CPD) is a "lifelong process of active participation in learning activities that assists individuals in developing and maintaining continuing competence, enhancing professional practice, and supporting achievement of career goals." Realizing the advantages of CPD and need to provide support for pharmacists individualized life-long learning, a CPD program is being developed for the ambulatory care clinical pharmacy department at Community Health Network. The pilot program will begin in early 2017 and will be evaluated on an annual basis. The goals of this program are to increase pharmacist involvement within the department, expand pharmacist clinical knowledge, support personal growth and achievement of personal goals, and develop precepting skills for pharmacy students and residents. Participation in program activities is flexible and may include any of the following: self-reflection with goal-setting, inter-department education sessions, pharmacy grand rounds, preceptor development, blinded chart reviews, and patient appointment shadowing. The purpose of this study is to evaluate ambulatory care clinical pharmacists knowledge and perceptions of a CPD program.

Methods: This study will consist of a 13-item survey that will be sent to all ambulatory care clinical pharmacists participating in the CPD program at Community Health Network. The survey consists of 4 demographic questions, 1 knowledge-based question, and 8 perception-based questions. The survey will be sent out electronically via SurveyMonkey, and participants will receive 2 reminder emails to complete the survey. The participants will have 6 weeks to complete the survey. All survey responses will remain anonymous as no identifiable information will be collected. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

List components of the continuing professional development model
Describe potential benefits and barriers of a continuing professional development program

Self Assessment Questions:

Which of the following is the first step in the continuing professional development process?

- A Plan
- B Learn
- C Evaluate
- D Reflect

Which of the following is a potential benefit of a continuing professional development program?

- A Increased workload for pharmacy management
- B Increased achievement of individual pharmacist career goals
- C Decreased pharmacist competence and engagement
- D Decreased time for patient care

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-871L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ANTIMICROBIAL STEWARDSHIP PROGRAM STRUCTURE AND ITS IMPACT ON THERAPY IN COMMUNITY-ACQUIRED PNEUMONIA

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Background: For decades, inappropriate prescribing of antibiotics has been a driving force behind increasing bacterial resistance. Community-acquired pneumonia (CAP) is the most common infectious diagnosis for patients admitted to the hospital setting. Because many patients complete antibiotic courses for CAP following discharge, effective inpatient stewardship is crucial to guide antimicrobial prescribing not only during the hospital stay but also to facilitate appropriate discharge therapy. Antimicrobial stewardship programs (ASPs) have been shown to improve patient outcomes, decrease antibiotic resistance, decrease *Clostridium difficile* infections, and decrease healthcare costs. Although the positive impact ASPs have is consistently similar, the way in which they are structured from one institution to the next may be different. This research looks to compare three hospitals' ASPs to assess how these different structures affect overall appropriate prescribing with respect to CAP treatment. **Methods:** This retrospective cohort study compared antibiotic prescribing for CAP patients across three community teaching institutions from within the same health system in Michigan. Adult patients were included if they were admitted to general practice units between March 1 and September 30, 2016 with a discharge diagnosis of CAP. Patients were excluded if they had received IV antibiotics in the past 30 days, lacked chest radiography, required intubation, required therapy escalation to include nosocomial pathogens, discharged against medical advice, or diagnosed with a concurrent infection. The primary outcome was the composite endpoint of optimal empiric therapy, definitive therapy, and therapy duration based on national guidelines. Secondary outcomes included comparison of IV to oral substitutions, 30 day readmission rate and *C. difficile* rates, and IV, oral, and total lengths of therapy. Baseline characteristics were compared using chi-square statistical testing. ANOVA testing was used to compare both primary and secondary outcomes. **Results:** Pending data analysis **Conclusion:** Will be presented at Great Lakes Residency Conference

Learning Objectives:

List the causative bacterial pathogens most commonly responsible for community-acquire pneumonia infections

Identify different strategies in which antimicrobial stewardship may reduce inappropriate use of antibiotics

Self Assessment Questions:

1. Empiric treatment for suspected community-acquired pneumonia should include coverage for which of the following?

- A: *Streptococcus pneumoniae*, atypicals, vancomycin-resistant Enter
- B: Atypicals, *Moraxella catarrhalis*, *Pseudomonas aeruginosa*
- C: *Candida albicans*, *Streptococcus pneumoniae*, *Haemophilus aphr*
- D: Atypicals, *Streptococcus pneumoniae*, *Haemophilus influenzae*

Which of the following stewardship strategies carries the highest recommendation for implementation per IDSA guidelines?

- A: Antibiotic cycling
- B: Institution-specific practice guidelines
- C: Yelling at prescribers
- D: Prospective audit and feedback

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-473L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IDENTIFICATION OF RISK FACTORS ASSOCIATED WITH MULTI-DRUG RESISTANT INFECTIONS AT A COMMUNITY HOSPITAL

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Purpose: As the prevalence of multi-drug resistant (MDR) infections continues increasing, it has become increasingly important to identify and treat high risk patients in a timely manner. The purpose of this study is to retrospectively analyze MDR cases at a community hospital to identify risk factors associated with their development and, based on the results, implement measures to effectively screen, identify, and treat patients. **Methods:** This study includes patients 18 years or older, seen at our institution from January 1, 2013, through December 31, 2015, with at least one culture for an extended-spectrum beta-lactamase (ESBL) or carbapenem-resistant Enterobacteriaceae (CRE) organism. Only initial isolates from each hospital admission were included for analysis. Retrospective data collection was performed via chart review and included demographics, comorbidities, length of stay, culture site, organism(s) isolated, and antimicrobial exposure in both the 90 days preceding admission and during the hospital admission prior to ESBL or CRE culture isolation. **Preliminary Results:** A total of 151 charts were reviewed and 117 patients were included in the final data analysis. The study population was 64.5% male, had a mean age of 71 years, and a mean hospital length of stay of 8.9 days. Roughly one-half of patients were admitted from a nursing home or skilled nursing facility and 37% of patients had a chronic indwelling urinary catheter. In the 90 days preceding admission, a majority of patients had antimicrobial exposure and 50% had a hospital admission. **Conclusion:** The preliminary results demonstrate that a majority of isolates were community acquired (home or nursing facility) and isolated from the urinary tract. The presence of a chronic indwelling catheter, previous hospital admission, and/or antimicrobial exposure in the preceding 90 days also appear to be risk factors for ESBL or CRE infection. Further sub-analysis is in progress to better characterize these risk factors.

Learning Objectives:

Identify risk factors that may be associated with ESBL or CRE infections

Describe the importance of properly identifying and treating patients at risk for ESBL or CRE infections

Self Assessment Questions:

Which of the following characteristics may be predispose a patient to developing an ESBL or CRE infection?

- A: Age less than 50 years
- B: Recent hospitalization(s)
- C: No prior antimicrobial exposure
- D: Ethnicity

All of the following are steps that can be taken to reduce the future emergence of ESBL and CRE infections except:

- A: De-escalating antimicrobial therapy
- B: Implementing an antimicrobial stewardship program
- C: Limiting antimicrobial exposure to the minimum treatment duration
- D: Using broad spectrum antibiotics for a prolonged period

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-568L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

OPTIMIZATION OF STUDENT PHARMACIST ROTATION REQUIREMENTS AND ITS IMPACT ON PATIENT SATISFACTION SCORES

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Purpose: An essential part of the Advanced Pharmacy Practice Experience (APPE) is for the student pharmacist to become proficient in the delivery of direct patient care. To foster this experience, early in 2016 the Department of Pharmacy implemented a medication education program requiring student pharmacists to educate five or more patients per week on new medications started in the hospital. Advantages of this project were two-fold: (1) the student pharmacist would have dedicated time for direct patient care, and (2) the institution would observe an increase in patient satisfaction scores surrounding medication related questions in the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey. This initiative was well intentioned, however, the goals of compliance and sustainability were not achieved and further refinement was needed. The primary purpose of this project was to redesign the medication education program to be more sustainable where APPE students could function independently as direct patient care providers and in return improve the patient experience of care as captured through the HCAHPS survey. **Methods:** Prior to implementation, surveys were distributed to two main stakeholder groups: (1) all students who completed an inpatient APPE rotation during from May 2016 through October 2016; and (2) preceptors of students who would be completing the redesigned medication education program between the months of November 2016 through February 2017. Survey results were comparatively analyzed to post-intervention survey data to measure impact of the redesign. Impact on patient satisfaction was measured through comparative analysis of pre-and post-intervention data of HCAHPS scores. Finally, to measure sustainability and compliance, students documented each education intervention in the electronic medical record and results were distributed to preceptors and students on a weekly basis. **Results/Conclusions:** Results and conclusions will be presented at the Great Lakes Resident Conference.

Learning Objectives:

Describe the role vigilant surveillance has on implementation projects
Identify barriers to implementing a hospital-wide student medication education requirement for APPE students

Self Assessment Questions:

Which of the following is a potential outcome of utilizing students to educate patients on new medications initiated while in the hospital?

- A: Increased readmissions
- B: Increased knowledge of medication related side effects
- C: Decreased HCAHPS scores
- D: Decreased knowledge of medication purpose

All of the following are barriers to utilizing students to impact patient satisfaction rates, except

- A: Student schedule
- B: Student buy-in
- C: Preceptor buy-in
- D: Patient buy-in

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-874L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
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IMPACT OF PARALYTIC AGENT ON TIME TO POST-INTUBATION SEDATION IN THE PRE-HOSPITAL SETTING

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Purpose: Etomidate and succinylcholines rapid onset, short duration of action, and minimal effect on hemodynamics make them ideal rapid sequence intubation (RSI) agents. However, succinylcholine can cause hyperkalemia and is avoided in certain patients. Rocuronium, an alternative neuromuscular blocking agent, has a relatively rapid onset, but longer duration of effect than succinylcholine. In the emergency department, rocuronium has been associated with delayed post-intubation administration of sedation and analgesia compared to succinylcholine. This timing has yet to be adequately studied in the pre-hospital setting. The aim of this study is to compare time to post-intubation sedation between those given succinylcholine versus rocuronium in the pre-hospital setting. **Methods:** This retrospective cohort study will compare time to first sedative in patients intubated with etomidate and succinylcholine versus etomidate and rocuronium. Patients intubated and transported by a single critical care ground and helicopter transport agency between July 1, 2010 and December 19, 2016 are eligible for evaluation. Included patients must have received etomidate plus succinylcholine or rocuronium to facilitate RSI by transport personnel. Patients <18 years old, pregnant, incarcerated, given a defasciculating paralytic dose, or not given sedation post-intubation due to a significant event will be excluded. The primary outcome is time between etomidate and first post-intubation sedative administration and will be compared between patients receiving succinylcholine and rocuronium. Secondary endpoints include number of sedative doses, cumulative sedative dose, and occurrence of post-intubation hypotension. Associations between the primary outcome and patient characteristics will be evaluated. Using a two-tailed alpha level of 0.05, 64 patients per group will be required to reach the power of 80%. Unpaired students t-test will be used to analyze the primary outcome and sedation post-intubation. Differences in occurrence of hypotensive episodes will be evaluated using Chi-squared test. **Results:** Study findings will be presented at The Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review the pharmacokinetic profile and hemodynamic effects of medications used during pre-intubation care.

Discuss the published literature describing the relationship between the neuromuscular blocking agent selected for rapid sequence intubation and the timeliness of post-intubation sedation.

Self Assessment Questions:

Which of the following medications produces sedation for an average duration of 6-10 minutes?

- A: Succinylcholine
- B: Rocuronium
- C: Etomidate
- D: Vecuronium

What is a common side effect associated with succinylcholine?

- A: Tachycardia
- B: Profound hypotension
- C: Rash
- D: Hyperkalemia

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-634L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION OF A PHARMACIST RUN NON-OPIOID ADDICTION TREATMENT CLINIC IN COLLABORATION WITH A REFERRING PRACTITIONER

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Purpose: The opioid epidemic in the United States continues to be a pressing issue at the forefront of the medical community. With the limited number of medication-assisted treatment options and the low success rates with what is currently available, it has become evident that a new approach to opiate addiction treatment is needed. This research program will look at the implementation of a pharmacist run Non-Opioid Addiction Treatment Clinic in collaboration with a referring physician.

Methods: Providers in both an inpatient and outpatient setting can refer patients to the Non-Opioid Addiction Treatment Clinic. Once the collaborative care agreement has been signed, the pharmacist will set up an appointment with the patient at the community pharmacy. Patients will be required to obtain a negative urine toxicology screen on the same day as the injection is administered. Once the appropriate lab work has been obtained the patient will be scheduled for a 1-hour appointment at the clinic. The collaborating pharmacist will provide patient education and an oral naltrexone challenge will be initiated. The injection will be filled and administered by the pharmacist on a 28-day basis and follow-up calls will be made as needed. A goal of six months of treatment will be set for each patient based on clinical trial data and the clinic will track success rates with pharmacist involvement. **Results:** While a new model has been created a physician has not signed the collaborative care agreement as of yet. Currently the clinic pharmacist is filling, administering, and counseling on an individual prescription basis. Monthly fills of the long-acting injectable have increased from 8 in July 2016 to over 65 in December 2016. **Conclusions:** A new model for outpatient opioid addiction treatment was developed in which the pharmacist not only fills the medication but also administers ensuring a smooth transition process for patients and improving patient adherence to treatment.

Learning Objectives:

Recognize the need for a new model for opioid addiction treatment
Identify the potential roles of the pharmacist in opioid addiction treatment in an outpatient setting

Self Assessment Questions:

What is a reason for the need of a new model for the treatment of opioid addiction in an outpatient setting?

- A: Limited access to healthcare providers
- B: Increase in profits for healthcare providers
- C: Provides a way to utilize grant money available for addiction treatment
- D: There is no need for a new model for the treatment of opioid addiction

Which of the following is a potential role for pharmacists in the treatment of opioid addiction treatment in an outpatient setting?

- A: Providing medical counseling for patients seeking addiction treatment
- B: Providing injections for patients getting long-acting naltrexone in setting
- C: Providing prescriptions for patients to get long-acting naltrexone in setting
- D: Providing treatment or support for opioid addiction in an outpatient setting

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-489L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

HIT OR MISS: ASSESSMENTS OF HEPARIN INDUCED THROMBOCYTOPENIA

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Purpose: Heparin induced thrombocytopenia (HIT) is an immune-mediated response that can occur following exposure to heparin products. This reaction can cause the formation of thrombi, which may lead to life-threatening adverse outcomes. The 2012 CHEST guidelines recommend using the calculated 4Tscore, which includes key clinical features of the reaction, in addition to clinical judgment to determine if additional testing is appropriate for patients with a suspected diagnosis of HIT. 4Tscores have been shown to correlate with the diagnosis of HIT, with low scores suggesting a low probability of HIT. The purpose of this study is to determine if education on the utility and calculation of 4Tscores, along with following the CHEST guideline recommendations, will decrease frequency of inappropriate laboratory testing for HIT, the unnecessary use of non-heparin anticoagulants, and hospital length of stay. **Methods:** This study is being conducted at Presence Saint Joseph Medical Center (PSJMC). Retrospective chart reviews from 06/01/2016 through 08/31/2016 have been collected for analysis, including results from HIT assays, essential lab values, 4Tscore calculations by a single reviewer, hospital length of stay, and non-heparin anticoagulants were administered. Physicians and pharmacists will be educated on the utility of 4Tscores and the pathophysiology of HIT to better determine if patients require further laboratory testing for a diagnosis of HIT. Following education, a retrospective chart review assessing the same data will be conducted from 1/15/2017 through 03/15/2017. **Summary:** Initial HIT assessments utilizing the 4Tscore should aid the health care team in ordering appropriate laboratory tests and confirming suspected diagnosis of HIT. This collaboration is expected to decrease costs of ordering unnecessary labs, use of non-heparin anticoagulants, and length of stay from avoidance of alternative anticoagulants. **Conclusion:** Data collection and analysis are currently in progress. Results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Describe the utility and clinical features of the 4Tscore

Explain the difference between Heparin Platelet Factor 4 ELISA and Serotonin Release Assay results in relation to the diagnosis of heparin induced thrombocytopenia

Self Assessment Questions:

Which of the following is a marker used in calculating 4Tscores?

- A: Bleeding
- B: Treatment with non-heparin anticoagulant
- C: Recent thrombosis
- D: Dose of heparin given

Which laboratory test is considered the gold standard for the diagnosis of heparin induced thrombocytopenia?

- A: Serotonin Release Assay
- B: Platelet count
- C: Heparin Platelet Factor 4 ELISA
- D: 4Tscore

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-682L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

COMPARISON OF NEONATAL ABSTINENCE COURSE BETWEEN NEONATES WITH DIFFERING OPIOID EXPOSURES

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Both prescription and illicit opioid abuse have increased exponentially over the past decade in the United States. This has resulted in a dramatic increase in the incidence of neonatal abstinence syndrome (NAS). Currently, there is no accepted guideline for NAS treatment and choice of agent and pace of treatment weaning are institution specific. Recently, Indiana University Health's NICU adopted an NAS treatment protocol. The goal of this study was to determine if differences exist in NAS treatment courses between neonates exposed to low doses (≤ 80 mg) versus high doses (> 80 mg) of methadone and between neonates exposed to methadone versus buprenorphine. This study was a retrospective chart review of neonates treated for NAS at Indiana University Health's Methodist Hospital. Data were collected from time of protocol adoption on March 16, 2015 through October 5, 2016. Maximum neonatal morphine dose, adjunct therapy received, length of hospital stay, length of NAS treatment, birth weight, gestational age, sex, and age at treatment were collected, along with maternal age, illicit drug, tobacco/alcohol, SSRI, and/or benzodiazepine use, and maintenance opioid and dose. Mann-Whitney U and Chi-Square tests were used to analyze data. There was no significant difference in maternal illicit drug, benzodiazepine, SSRI or tobacco/alcohol use between buprenorphine and methadone groups or between high and low dose methadone groups. Neonates exposed to buprenorphine had significantly shorter length of hospital stay ($p < 0.001$) and length of NAS

treatment ($p = 0.003$) compared to methadone. They also required significantly less morphine ($p = 0.025$), had higher birth weight ($p = 0.001$)

and longer gestational age ($p = 0.004$) compared to the methadone group. There were no significant differences between high and low

dose methadone except birth weight. These findings suggest that neonates exposed to buprenorphine require a milder treatment course

compared to methadone exposed neonates. This may assist in development of a buprenorphine specific NAS treatment protocol.

Learning Objectives:

Review common signs and symptoms of neonatal abstinence syndrome
Discuss maternal risk factors that can negatively impact neonatal abstinence treatment course.

Self Assessment Questions:

Which of the following is often considered the "hallmark" sign of neonatal abstinence syndrome?

- A: Hyperactive reflexes
- B: Seizures
- C: High-pitch crying
- D: Diarrhea

In utero exposure to which of the following can mimic neonatal abstinence syndrome?

- A: Citalopram
- B: Tobacco
- C: Divalproex
- D: Marijuana

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-543L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

A LONGITUDINAL ANALYSIS OF PHARMACIST-DRIVEN INHALER OPTIMIZATION IN THE AMBULATORY CARE SETTING

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Purpose: Asthma and COPD management is complicated by hospitalizations and emergency department visits which lead to higher health care costs for the patient and health system. The mainstay for managing both asthma and COPD is inhaled therapy. Unfortunately, the overall prevalence of correct inhaler technique is 31%. While inhaler technique education is recommended for patients with asthma and COPD, education alone does not ensure appropriate technique. An alternative approach is to use an objective assessment of patients' inhaler technique using a tool such as the Vitalograph Aerosol Inhalation Monitor (VAIM) in conjunction with a pharmacist's education session within the ambulatory care setting. The purpose of this study is to determine the reproducibility and sustained impact of objective assessment of inhaler technique incorporated into pharmacy/physician collaboration on clinical outcomes in patients with COPD and asthma.

Methods: This quasi-experimental study was approved by Henry Ford Hospital Institutional Review Board. Adult, English speaking patients with a diagnosis of COPD or asthma who presented to the pulmonary clinic at Henry Ford Hospital were included. Patients were excluded if they presented for imaging results review, had a tracheostomy, or had a diagnosis of interstitial lung disease, sarcoidosis, or lung cancer. Patients met with the pharmacist for inhaler assessment with the VAIM followed by regimen recommendations and education. The pharmacist then made phone calls one, four, and twelve weeks after the visit to follow up. The primary outcome was the pharmacist's impact on improving asthma and COPD control as defined by changes in asthma control test or COPD assessment test scores, patient reported symptoms, and rescue inhaler use. Secondary outcomes included changes in patient adherence and identifying barriers to optimizing inhaled regimens. Results and Conclusions: Data collection and analysis will be presented at the Great Lakes Conference.

Learning Objectives:

Report the current status of inhaler technique amongst patients and its effect on asthma and COPD control

Describe the role of the Vitalograph Aerosol Inhalation Monitor in optimizing inhaler regimens

Self Assessment Questions:

Which of the following best describes why objective assessment of inhaler technique is important for patients with asthma and COPD?

- A: The overall prevalence of correct inhaler technique is 50%
- B: Education on inhaler technique is effective but is very time consuming
- C: Inhaler education significantly reduces 90 day readmissions for COPD
- D: Some patients cannot use certain devices despite education

Which of the following is true about the Vitalograph Aerosol Inhalation Monitor?

- A: It is a tool that has been proven to correct inhaler technique in patients
- B: It measures forced vital capacity (FVC), forced expiratory volume in 1 second (FEV1)
- C: It is a tool that can be used to determine if a patient has the adequate inspiratory volume
- D: It has four different settings including dry-powdered inhaler, metered dose inhaler, nebulizer, and spacer

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-354L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF CLINICAL PHARMACY SERVICES ON ANTIMICROBIAL STEWARDSHIP INITIATIVES IN THE EMERGENCY DEPARTMENT

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Purpose: It is well documented that pharmacy services in the emergency department (ED) enhance patient care. Pharmacists have proven useful in code situations, medication reconciliation, discharge counseling, and consults for therapy management. A significant opportunity exists with the large number of prescriptions written in the ED that involve antibiotics. In order to reduce costs, prevent resistance, and increase the quality of patient care, antimicrobial stewardship (AMS) programs have expanded to the ED and pharmacists are poised to be key players. The Doctors Hospital (DH) Department of Pharmacy provides clinical services, including AMS, to the intensive care unit and general medical floors. While pharmacists are available in the central pharmacy, they are not physically present in the ED. This is a quality improvement study to determine the physical presence of a pharmacist in the DHED has a positive impact on patient care. The focus was on AMS in patients with presumed community-acquired pneumonia (CAP), urinary tract infection (UTI), and skin and soft tissue infection (SSTI) diagnoses. The primary goal was to compare antimicrobial therapy selection at time of prescribing both with and without pharmacist presence. The secondary goal was to determine if an ED pharmacist resulted in more consults for drug information and recommendations, as well as increased ED staff satisfaction. **Methods:** Prescribing patterns for antimicrobial therapy along with number and category of consults processed by pharmacists in the central pharmacy from November 15, 2016 through December 14, 2016 were obtained and compared to those after pharmacist intervention in the ED. Potential study subjects were identified by a documented initial diagnosis of CAP, UTI, or SSTI in their electronic medical record. Data was reviewed retrospectively following the intervention. **Results/Conclusions:** Results and conclusions will be presented at Great Lakes Pharmacy Conference

Learning Objectives:

Discuss the benefits of pharmacist presence in the emergency department

Describe the challenges to initiating pharmacy services in the emergency department

Self Assessment Questions:

Which of the following are benefits of having a full-time pharmacist in the emergency department?

- A: Greater adherence to P&T approved guidelines
- B: Decreased medication safety
- C: Educational resource for patients and staff
- D: Both A and C

Which of the following is a likely challenge researchers will encounter in initiating pharmacy services?

- A: Obtaining funding for an additional full-time position
- B: Finding activities suitable for pharmacy
- C: Acceptance into the interdisciplinary team
- D: None of the above

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-761L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION OF A STEP-WISE, MULTI-LAYERED EDUCATION AND INTERVENTION APPROACH TO REDUCE THE USE OF RESTRICTED ANTIMICROBIALS AND IMPROVE PATIENT OUTCOMES

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Purpose: Clostridium difficile infection (CDI) is a hospital-acquired infection associated with increased morbidity and healthcare costs. Antimicrobial use, especially third-generation cephalosporins, clindamycin, and fluoroquinolones, is a major risk factor for CDI. Studies have demonstrated that clinical pharmacists can increase adherence to antimicrobial treatment bundles with antimicrobial stewardship oversight. Limited data exists evaluating the impact of an antimicrobial stewardship initiative involving an entire pharmacy practice model. The objective of this study is to evaluate the effect of a step-wise, multi-layered education and intervention model that will provide coaching and feedback on use of restricted antimicrobials and patient outcomes.

Methods: This is a pre/post, quasi-experimental, single-center study comprised of a historical control period and an interventional period with two distinct phases. During the historical control period, clinical pharmacists were responsible for ensuring appropriate use of restricted antimicrobials with limited oversight by the antimicrobial stewardship team (AST). Phase I of the intervention period will consist of pharmacists interventions with prospective AST audit and feedback in addition to monthly reports with hospital-acquired (HA) CDI outcomes and restricted antimicrobial utilization data. Phase II of the intervention period will consist of pharmacists interventions with only the monthly reports and no direct AST oversight. The study will compare a 6-month historical control period to an 8-month intervention period composed of two four-month phases. Adult patients admitted to an inpatient medical service at Michigan Medicine who were started on a restricted antimicrobial agent (fluoroquinolones, ceftriaxone, or clindamycin) from 01/01/2016 through 06/30/2017 were included. The primary outcome is days of therapy on the restricted antimicrobial agent(s) per 1000 patient-days. Secondary outcomes include appropriate use of restricted antimicrobial agent(s) and rate of HA-CDI. Appropriate descriptive statistics will be utilized to analyze these data. **Results/Conclusion:** Results and Conclusion will be presented at the 2017 Great Lakes Pharmacy Residency Conference

Learning Objectives:

Identify antimicrobial agents with highest risk for Clostridium difficile infections

Describe the impact of antimicrobial use on rates of Clostridium difficile infections

Self Assessment Questions:

Which of the following antimicrobial agents has NOT demonstrated high risk for development of Clostridium difficile infection?

- A: Fluoroquinolones
- B: Voriconazole
- C: Clindamycin
- D: Ceftriaxone

Which of the following strategies is an effective way to reduce Clostridium difficile infections?

- A: Reduce handwashing compliance
- B: Increase use of Histamine-2 receptor antagonists
- C: Restrict antibiotic use
- D: Increase use of proton pump inhibitors

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-683L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

A PROSPECTIVE ANALYSIS DESCRIBING THE INNOVATIVE USE OF LIPOSOMAL BUPIVACAINE TO MANAGE DONOR SITE PAIN IN BURN SURGERY PATIENTS

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Purpose: Burn patients frequently require autograft harvesting from donor sites to facilitate wound healing, which results in pain that is difficult to control. Liposomal bupivacaine is indicated for administration into a surgical site to produce postsurgical analgesia. It has been studied in a variety of surgical procedures, including soft tissue, plastic reconstructive, cosmetic, and orthopedic. The objective of this study is to evaluate the efficacy, safety, and duration of postoperative analgesia with liposomal bupivacaine versus traditional management strategies of donor site pain in burn surgery patients. **Methods:** This is an observational, case-control study including adult burn patients with < 20% total body surface area (TBSA) who receive liposomal bupivacaine for postoperative pain management after autograft harvesting from lower extremity donor site(s). Prior to data collection, an institution-specific protocol was developed and approved by the P&T Committee. Patients from the case group are matched to historical control patients treated with traditional pain management strategies (nerve block or opioids) based upon TBSA, burn injury (depth and size), surgical management, and age. The primary outcome is the cumulative pain scores on postoperative days 1, 2, and 3 measured by the area under the pain score time curve. Secondary outcomes include time to first dose of rescue opioid, total morphine equivalents administered through 72 hours, length of stay, and study medication and/or opioid-related adverse effects. **Preliminary Results:** Since protocol approval, two patients have met inclusion criteria; however, only one patient was appropriate for data collection. No adverse events related to the administration of liposomal bupivacaine were observed. **Conclusions:** To our knowledge, no previously published literature exists evaluating the use of this agent in burn surgery patients. Further data collection is on-going to determine the efficacy of liposomal bupivacaine in this patient population.

Learning Objectives:

Identify three opioid-related adverse events and their associated consequences.

Describe current gaps in the literature regarding the use of liposomal bupivacaine in burn surgery patients.

Self Assessment Questions:

Which of the following is a potential consequence of opioid-related adverse events?

- A Decreased hospital costs
- B Increased length of hospital stay
- C Higher patient satisfaction scores
- D Lower post-operative pain scores

Which of the following is lacking in current data regarding the use of liposomal bupivacaine in burn patients?

- A Use of a control group to determine efficacy
- B Pain scores measured post-operatively
- C Administration of liposomal bupivacaine into a donor site
- D Evaluation for donor site complications

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-330L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION OF AN OUTPATIENT PHARMACIST-RUN TRANSITIONS OF CARE CLINIC IN AN INTERNAL MEDICINE CLINIC

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Purpose: The riskiest time for medication-related adverse effects is the period immediately following hospital discharge. Literature reports that almost half of patients experience a preventable medication error post-hospital discharge and half of medications prescribed at discharge are never filled or are taken incorrectly. Studies have shown that pharmacist intervention can reduce these errors and therefore reduce preventable readmissions. As hospitals strive to reduce readmissions and optimize their quality of care, patient transitions have been highlighted as an area of improvement. The purpose of this project is to implement and evaluate the impact of a pharmacist-run outpatient Transitions of Care (TOC) clinic by collaborating with physicians to optimize patients medication therapy and to increase patient adherence to therapy by providing medication and disease state education. **Methods:** This study was conducted at Advocate Illinois Masonic Medical Center (AIMMC), a community teaching hospital in Chicago. This is a single center, quality improvement study comparing a study population of patients seen by a TOC pharmacist to a historical population of patients receiving standard post-discharge care. Patients were eligible if they were scheduled for an appointment with a primary care physician (PCP) in the Internal Medicine Clinic upon discharge from AIMMC. Study patients were scheduled for an appointment with a pharmacist prior to their PCP appointment. The pharmacist completed a chart review, reconciled all medications and made interventions to the physician when appropriate. The patients appointment included medication counseling, disease state education and medication assistance, if necessary. The primary endpoint is 30-day hospital readmission rate. Additional endpoints include pharmacist interventions, patient knowledge and patient adherence to medications. Results will be analyzed to determine the significance of a pharmacist involved in the post-hospital transition of care. **Results/Conclusion:** To be presented at the GLPRC.

Learning Objectives:

Review components of an effective transition of care

Explain potential benefits of pharmacist involvement at discharge

Self Assessment Questions:

Which of the following is NOT a component of a good transition of care?

- A Patient has prescription for all new medications
- B An expensive medication is prescribed without ensuring that the patient can afford it
- C Patient is counseled on all current medications
- D All of the above

What are potential benefits to pharmacist involvement at discharge?

- A Pharmacist can prescribe new medications they feel are necessary
- B Pharmacist provides all medications to patient at no charge
- C Patients in need of assistance in obtaining medications can be identified
- D All of the above

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-438L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ANALYSIS OF DESMOPRESSIN ADMINISTRATION IN INTRACRANIAL HEMORRHAGE FOR REVERSAL OF ANTIPLATELET AGENTS

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Purpose: According to the American Heart Association, stroke is the number five cause of death in the United States. Intracranial hemorrhage (ICH), a type of hemorrhagic stroke, accounts for 15% of strokes annually and is related to a 6-month mortality of 30-50%. Patients taking anticoagulation or antiplatelet therapy at the time of ICH are at greater risk for mortality and have a high likelihood of secondary hematoma expansion, which correlates with neurological deterioration and poor outcomes. Desmopressin acetate has shown to increase levels of Von Willebrand factor in patients with ICH, leading to shortened bleeding time, improved hemostasis, and reduced postoperative blood loss. Mechanistically, desmopressin has been proposed to improve patient outcomes, which has been demonstrated in some small case reports. The purpose of this study was to evaluate outcomes in patients with ICH receiving desmopressin for anti-platelet reversal. **Methods:** A retrospective, case-control analysis of patients with ICH was conducted at an academic level I trauma facility. Data for the study population was generated based upon International Classification of Diseases, ninth revision (ICD-9) diagnostic codes. The treatment group included patients who presented with ICH, had documented home use of aspirin or clopidogrel and received desmopressin for reversal. The primary endpoint of the study was survival to hospital discharge. Secondary endpoints included hematoma growth, surgical intervention, and discharge status (defined as death, discharge to home, acute rehabilitation, or long term sub-acute rehabilitation). A subgroup analysis was conducted assessing patient outcomes based on type of home antiplatelet therapy (aspirin vs. clopidogrel). A chi-square test was used to analyze the primary outcome as well as the subgroup analysis. Secondary endpoints were descriptive in nature and analyzed using a student's t-test. **Conclusions:** Results and conclusions will be presented at Great Lakes.

Learning Objectives:

Review the recommendations in the Neurocritical Care Society guidelines for pharmacologic management of patients presenting with intracranial hemorrhage (ICH)
Discuss the outcomes of patients receiving desmopressin in ICH for antiplatelet reversal

Self Assessment Questions:

What is the mechanism of action by which desmopressin affects platelet function?

- A: Increases water reabsorption in the collection ducts of the kidneys
- B: Stimulates an increase in blood factor VIII, von Willebrand factor, etc.
- C: Increases endogenous vitamin K
- D: Allows for the increase in all blood clotting factors

What dosing is recommended by the Neurocritical Care guidelines for desmopressin administration for reversal of antiplatelet agents?

- A: 0.2 mcg/kg IVPB one time
- B: 10 mcg IVPB one time
- C: 4 mcg IVPB Q12H for 4 doses
- D: 0.4 mcg/kg IVPB one time

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-571L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

THE VALIDITY AND RELIABILITY OF A TOOL FOR ASSESSING AMBULATORY CARE PHARMACISTS (TAAPP)

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Purpose: To better define, identify, and understand the diverse tasks that ambulatory care pharmacists perform, this project aims to update and demonstrate the validity and reliability of a survey tool that will be used to assess and stratify the scope of ambulatory care services provided by ambulatory care pharmacists. This tool will be used in future research.

Methods: For the current project, the Pharmaceutical Care Clinical Pharmacist Questionnaire (PCCPQ), originally developed in the early 2000s, was updated with current language using the Pharmacists' Patient Care Process as a guide. Face validity was determined by the researchers. To establish content validity, the updated survey was sent via email to five experts in ambulatory care pharmacy practicing in various settings for review. Upon receipt of their feedback, the survey tool was updated. Following the establishment of content validity and IRB approval, the second phase of the project will be to conduct a pilot study. At this point, the survey will be disseminated electronically to embedded pharmacists practicing at their clinic site for at least 2 years and who provide one-on-one outpatient services in person or telephonically. Sample size for the pilot study will be dependent on the final number of items on the survey and the number of responses per item. To assess the reliability of the updated survey, an internal consistency reliability analysis will be performed and an α -coefficient determined for each domain as well as the overall survey.

Summary of Preliminary Results to Support Conclusion: Research is in progress and results will be presented at the Great Lakes Residency Conference

Conclusions: To be presented at the conference.

Learning Objectives:

Describe the need for assessing ambulatory care pharmacists and the services that they provide.
List the ways that the Pharmaceutical Care Clinical Pharmacist Questionnaire was used in previous ambulatory care research.

Self Assessment Questions:

Which of the following best describes the use of the Pharmaceutical Care Clinical Pharmacist Questionnaire (2000) in previous ambulatory care research?

- A: To stratify the services provided by ambulatory care pharmacists
- B: To compare patient outcomes based on the level of services provided
- C: To define patient's perceived happiness when interacting with an ambulatory care pharmacist
- D: To describe the effectiveness of the ambulatory care pharmacist

Which of the following identifies a reason to better understand ambulatory care pharmacists work flow and activities?

- A: To more accurately compare the ambulatory care pharmacist's work
- B: To understand the interprofessional team's perceived happiness with the pharmacist
- C: To understand the patient's perceived happiness when interacting with the pharmacist
- D: To provide more accurate descriptions of ambulatory care pharmacist

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

CORRELATION BETWEEN 4T SCORE AND HEPARIN INDUCED THROMBOCYTOPENIA IN MEDICAL INTENSIVE CARE PATIENTS

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Purpose: Heparin induced thrombocytopenia (HIT) is an immune mediated reaction that can occur in patients receiving heparin products. HIT occurs due to formation of anti-heparin antibodies, which activate platelets and can trigger thrombosis. Thrombocytopenia occurs in approximately 30-50% of ICU patients. However, HIT frequency in the ICU is only between 0.3 and 0.5%. There are many factors that contribute to thrombocytopenia in the ICU including infection and medications besides heparin that can lead to over-diagnosis of HIT. The 4T score is a clinical calculator used to assess the likelihood of HIT by assessing the timing and degree of platelet drop, clot formation, and whether other causes of thrombocytopenia are present. It is unclear whether this score is effective in predicting a HIT diagnosis in ICU patients with many other potential causes of thrombocytopenia. The purpose of this study is to determine whether the 4T score and the corresponding probability of HIT correlate to a positive or negative HIT antibody result and to assess whether it is an effective clinical tool in the ICU. **Methodology:** This study is a retrospective chart review with IRB approval. Inclusion criteria include adults in the medical ICU who were on heparin products for anticoagulation and had a HIT antibody ELISA test ordered. Exclusion criteria include prisoners, surgical ICU patients, or patients in the ICU for less than 48 hours. The primary outcomes will be the percentage of low HIT probability scores (4T<3) that had a positive HIT antibody result and the percentage of intermediate (4T score 4-5) or high (4T>6) scores that had a positive HIT antibody result. Secondary outcomes will include the percentage of patients with an intermediate or high likelihood of HIT who were appropriately switched to a nonheparin anticoagulant and which agent they were switched to. **Results and conclusions:** To be determined.

Learning Objectives:

Classify a patient's likelihood of heparin induced thrombocytopenia based on the calculation of their 4T score.

Recognize when it is appropriate to discontinue heparin products and initiate non-heparin anticoagulants based on the probability of heparin induced thrombocytopenia.

Self Assessment Questions:

A calculated 4T score of five correlates to which of the following probabilities of a heparin induced thrombocytopenia diagnosis:

- A: Low probability of HIT
- B: Intermediate probability of HIT
- C: High probability of HIT
- D: Very high probability of HIT

If a patient has an intermediate or high suspicion of HIT, then heparin should be discontinued and an appropriate anticoagulant, such as argatroban, should be started:

- A: As soon as possible and before the HIT antibody lab result is available
- B: After a diagnosis of HIT is confirmed through laboratory tests
- C: Only if a patient develops a thrombosis
- D: When the platelets drop below 150 x 109/L

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-659L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTING A DRUG COST AWARENESS PROGRAM FOR ANTIMICROBIAL AGENTS IN A COMMUNITY HEALTH SYSTEM

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The management of drug costs has become a very important issue in healthcare. Pharmaceutical costs have risen 9.8% over the past year.¹ In 2014 the average cost to gain market approval for a drug was estimated to be \$2.6 billion.² Drugs that have been on the market for years, such as EpiPen and Daraprim, are seeing huge price increases as well. The increase in drug costs affects all aspects of the drug supply chain, including patients and health systems. The pharmacy department plays a major role in controlling drug costs by offering cheaper alternatives to high cost drugs and discouraging the inappropriate use of drugs. The Joint Commissions (TJC) recent addition of antimicrobial stewardship standards highlights the importance of controlling the usage of antimicrobial agents. A program to increase physicians' awareness of antimicrobial drug costs will help control the health system's expenses and usage of antimicrobials. A taskforce of selected administrators and health information technologists was created to determine the project objectives and assist in project decision making. The health system's pharmacoeconomics committee was utilized as an advisory group. Purchasing information from the health system's distributor was used to determine the unit dose cost of antimicrobials. The unit dose cost data was used to stratify drugs into four tiers based on cost. Tier information was implemented into the electronic health record (EHR) to indicate cost information in the ordering function. This project is a quality improvement project and is therefore exempt from review by the Institutional Review Board.

Analysis is in progress. Final conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify two reasons for the high rise in drug costs

Describe how a drug cost awareness program can help mitigate the use of high cost drugs

Self Assessment Questions:

Which organization recently added antimicrobial stewardship standards?

- A: The Joint Commission (TJC)
- B: The Institute of Safe Medication Practices (ISMP)
- C: The Centers for Medicare and Medicaid Services
- D: Urac

What is the estimated cost of obtaining market approval for a drug

- A: \$5 million
- B: \$109 million
- C: \$2.6 billion
- D: \$13 billion

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-800L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ANTIMICROBIAL STEWARDSHIP RE-ENVISIONED! AN OLD ANTIMICROBIAL STEWARDSHIP INTERVENTION ENHANCED WITH A CLINICAL DECISION SUPPORT TOOL

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Purpose: Implementation of an antimicrobial stewardship program (ASP) is a required condition for participation by The Joint Commission. "Low-hanging fruit" interventions, such as parenteral to enteral (IV-to-PO) interchange, are key to accumulating early successes in an ASP. This project develops a new pediatric IV-to-PO guideline and delegation protocol, a novel clinical decision support tool (CDS) to support guideline and protocol implementation, and measures the tools impact.

Methods: The ASP began in May 2016 and IV-to-PO Interchange was identified as a core element by the ASP committee. The pediatric guideline was created by melding resources from a national pediatric stewardship collaborative and the existing adult guideline and vetted by an interdisciplinary committee. A delegation protocol empowers the guideline when physicians delegate pharmacists to perform IV-to-PO interchange upon patients meeting appropriate criteria. A CDS tool was developed in Epic to aid pharmacists by identifying patients for route interchange based on objective criteria. The CDS tool also allows inline clinician feedback to facilitate a quality improvement cycle for the guideline and CDS tool. Impact of the route interchange guideline, associated protocol, and CDS tool will be measured using days of therapy (DOT) per 1000 patient days as defined by the National Healthcare Safety Network (NHSN), antimicrobial costs, and central line days. **Results:** The guideline and protocol were created and approved by an interdisciplinary workgroup. Pre-implementation data shows the monthly average DOT for the intravenous route exceeding the monthly average DOT of the oral route for clindamycin, levofloxacin, and metronidazole. Feedback and interchange results from the CDS tool and post-implementation DOT data will be presented at the Great Lakes Pharmacy Residency Conference. **Conclusions:** This project is expected to decrease intravenous antibiotic DOT, reduce antimicrobial costs, and reduce central line days for pediatric patients. Final conclusions will be presented at the Great Lakes Residency Conference

Learning Objectives:

Describe the benefits of parenteral to enteral route conversion for inpatients

Identify important criteria to consider when evaluating medications for inclusion in a route interchange clinical practice guideline

Self Assessment Questions:

Why is the enteral route preferred over the parenteral route for medication delivery?

- A Decreased risk of infection
- B Improved safety
- C Increased patient compliance
- D Both A and B

What medication characteristics are important to consider when changing the route of administration?

- A Bioavailability
- B Color of medication
- C Enteral tolerance
- D Both A and C

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-876L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ASSESSMENT OF THE IMPACT OF APPLYING QUALITY MATTERS (QM) STANDARDS TO THE SUCCESS OF AN ONCOLOGY PHARMACY ONBOARDING PROGRAM

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BACKGROUND & RATIONALE Between the years 2010 and 2030, there is a predicted 45% increase in the incidence of cancer and a resulting need for adequately trained healthcare providers. This increased need of healthcare providers includes pharmacists who work in the oncology and hematology setting. At The Ohio State University's Arthur G. James Cancer Hospital and Richard J. Solove Research Institute, the pharmacy practice model encompasses clinical specialist pharmacists and clinical generalist pharmacists. Clinical generalist pharmacists are required to have completed a PGY1 Pharmacy Practice Residency, or have equivalent experience, often times resulting in minimal to no formal oncology training to support their professional practice. The purpose of this project is to develop a standardized oncology onboarding program for newly hired clinical generalist pharmacists to improve their baseline competency in oncology. This program will be developed utilizing the QM Continuing and Professional Education Framework, a nationally recognized quality assurance program designed to support the success in developing educational programs. **OBJECTIVE** The primary objective is to measure the impact of the oncology onboarding program via a pre-test, post-test methodology. Secondary objectives include identifying if particular factors, such as participant demographics, time spent in self-study, and satisfaction, correlate with increased performance on the post-test.

PROCEDURES All new oncology generalist pharmacists will participate in all learning modules of the onboarding program. Each content area will include self-assessment questions to be completed by the participant. Clinical generalist pharmacists' scores on a clinical oncology pharmacy competency assessment will be compared before and after participating in the program. A satisfaction survey will be conducted after the post-exam is administered to identify strengths and weaknesses of the onboarding program. Focus areas for the survey include the learning modules, pre and post-tests, and overall course structure. **RESULTS** Preliminary results will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the process to developing a clinical onboarding program for oncology generalist pharmacists.

Identify measures to ensure for long-term sustainability and success of a pharmacist training program.

Self Assessment Questions:

Which of the following was used as the framework for developing a standardized oncology onboarding program?

- A Quality Matters (QM)
- B American Society of Health-System Pharmacists (ASHP)
- C American Association of Colleges of Pharmacy (AACP)
- D Hematology/Oncology Pharmacists Association (HOPA)

Which of the following is the least important characteristic of a clinical oncology onboarding program?

- A Clinical pharmacy knowledge advancement
- B Providing continuing education credit
- C Employee satisfaction
- D Obtaining departmental chemotherapy competency

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-783L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

THE OPIOID- AND SEDATIVE-SPARING EFFECTS OF CHLORPROMAZINE IN INFANT AND TODDLER POST-OPERATIVE CARDIOVASCULAR SURGERY PATIENTS LESS THAN 3 YEARS OF AGE.

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Purpose: Pediatric patients with congenital heart disease often require cardiac surgery which results in the need for pain and sedative medications after the operation to maintain comfort and decrease anxiety. Although chlorpromazine is commonly used at our institution as an adjunct medication for sedation after pediatric cardiovascular surgery, literature demonstrating the safety and/or efficacy of this practice is sparse. The objective of this study was to determine the safety and efficacy of chlorpromazine and determine its opioid- and sedative-sparing effects. **Methods:** In this retrospective cohort study, patients aged 1 month to 3 years who received chlorpromazine within 72 hours of cardiovascular surgery between January 1, 2010 and August 1, 2016 were included. Patients who received chlorpromazine were matched via a cohort control model with patients who did not receive chlorpromazine in a 1:1 ratio based on age, primary congenital heart lesion, cardiac surgery, surgery year, and post-operative day. Patients with Trisomy 21 were included in the study and analyzed separately. Baseline characteristics collected include age, weight, gender, severity of illness score, primary congenital heart lesion, cardiac surgery, and prior surgeries. The cumulative daily dose of sedatives and opioids (opioid doses converted to fentanyl equivalents) in the 72 hours following chlorpromazine initiation were collected, as well as efficacy endpoints such as duration of mechanical ventilation, duration of hospital length of stay, ICU length of stay, and mortality. Safety endpoints collected include naloxone or flumazenil administration, incidence of QTc prolongation, Torsades de pointes, extrapyramidal symptoms, and neuroleptic malignant syndrome. **Results/Conclusion:** Data collection and analysis are in process and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the benefits of minimizing opioid and sedative exposure in children.

Discuss the opioid and sedative requirements of pediatric cardiovascular surgery patients who receive chlorpromazine.

Self Assessment Questions:

Which of the following is a benefit of minimizing opioids and sedatives?

- A: Shorter duration of mechanical ventilation
- B: Shorter ICU length of stay but longer hospital length of stay
- C: Shorter hospital length of stay but longer ICU length of stay
- D: Increased hemodynamic stability following cardiac surgery

Based on studies of antipsychotic use in adults and children, we may expect chlorpromazine use in pediatric patients after cardiovascular surgery to:

- A: Increase mortality due to its QTc prolonging effects
- B: Decrease the amount of opioids used but increase the amount of sedatives
- C: Decrease the amount of opioids used without worsening sedation
- D: Significantly lower mean arterial pressure after surgery

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-671L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

INCIDENCE AND RISK FACTORS ASSOCIATED WITH NEPHROTOXICITY IN PEDIATRIC PATIENTS TREATED WITH CONCOMITANT VANCOMYCIN AND PIPERACILLIN-TAZOBACTAM

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Purpose: The primary objective of this retrospective study is to evaluate the incidence and associated risk factors of nephrotoxicity associated with the concomitant use of intravenous vancomycin and piperacillin-tazobactam in pediatric patients. The published incidence of vancomycin nephrotoxicity is 5% to 35%; however piperacillin-tazobactam is rarely associated with nephrotoxicity. Increased nephrotoxicity with this combination has been reported in the adult population, but data in the pediatric population are limited. **Methods:** A single-center retrospective cohort evaluation of the development of nephrotoxicity in patients who received concomitant vancomycin and piperacillin-tazobactam treatment for a minimum of 72 hours was performed. Patients were identified by searching electronic health records for the first episode of concomitant therapy between January 1, 2012 and December 1, 2016. Patients less than 28 days old, greater than 18 years old, and patients with pre-existing kidney disease were excluded. The 2011 Kidney Disease: Improving Global Outcomes Clinical Practice Guideline for Acute Kidney Injury was used to assess nephrotoxicity. Descriptive statistics will be used to evaluate the incidence of acute kidney injury associated with concomitant vancomycin and piperacillin-tazobactam therapy. Risk factors for the development of acute kidney injury will also be evaluated. Data extracted from the medical record include: age, gender, weight, height, serum creatinine values, blood urea nitrogen values, urine output, indication for antimicrobial treatment, vancomycin dose and frequency, vancomycin trough levels, piperacillin-tazobactam dose and frequency, length of concomitant therapy, concomitant nephrotoxic medications, length of hospital stay, and intensive care unit days. This retrospective evaluation was deemed exempt by the Institutional Review Board. **Results/Conclusions:** A total of 204 patients (59% male) were included in the cohort evaluation. Median age at the time of concomitant piperacillin-tazobactam and vancomycin was 4.1 years old (range: 30 days - 17.8 years). Additional data review and analysis will be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review published literature evaluating the incidence and risk factors associated with concomitant piperacillin-tazobactam and vancomycin therapy

Identify risk factors that may be associated with nephrotoxicity when using concomitant piperacillin-tazobactam and vancomycin therapy in pediatric patients

Self Assessment Questions:

What is the mechanism of nephrotoxicity for vancomycin?

- A: Impurities in the product
- B: Renal vasoconstriction and direct renal tubular epithelial cell toxicity
- C: Accumulation in the proximal tubules causing cellular necrosis
- D: Inhibits a cationic transporter in the proximal convoluted tubule

Which of the following medications does not cause nephrotoxicity?

- A: Acyclovir
- B: Methotrexate
- C: Furosemide
- D: Bevacizumab

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-525L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

INTERVENTIONS AND COST SAVINGS ASSOCIATED WITH PHARMACY RESIDENT ROUNDING ON WEEKENDS IN A MEDICAL INTENSIVE CARE UNIT

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Studies have shown that clinical pharmacists have a positive impact on care of critically ill patients by reducing adverse drug events and medication costs. Prior to August 2016, the medical intensive care unit (MICU) at Cleveland Clinic Akron General did not have a pharmacist rounding on weekends which resulted in missed opportunities for pharmacist intervention and a negative impact on patient care. The objective of this study is to describe the number and type of interventions made by pharmacy residents rounding in the MICU on weekends and associated medication and laboratory cost savings. Two PGY-2 critical care pharmacy residents rotate rounding with the MICU team on weekends, respond to code blue, stroke, and trauma alerts and chart review patients in other critical care units as time permits. A description of each intervention made per patient was recorded by the pharmacy residents and whether this intervention was accepted by a physician. Interventions made on weekends from September 17, 2016 to December 31, 2016 were categorized by type and analyzed for associated cost savings based on cost for the hospital to procure the drug or price charged to patients for lab tests as stated on the hospital website. Over 27 weekend days, the pharmacy residents were able to make 905 interventions with a 98% physician acceptance rate. Of the patients who required pharmacist intervention, there was an average of 3.4 interventions made per patient. The most common types of interventions included discontinuation of inappropriate medications and non-pharmacologic interventions which included laboratory monitoring and nutrition recommendations. PGY-2 pharmacy residents were able to fill a void in the pharmaceutical care of critically ill patients at Cleveland Clinic Akron General and demonstrate cost savings from therapeutic interventions. This staffing model may be effective at other institutions that do not have clinical pharmacist coverage on weekends.

Learning Objectives:

Discuss the position of the American College of Critical Care Medicine on pharmacist presence in critical care units.

Review the available literature supporting the impact of pharmacists working in critical care units.

Self Assessment Questions:

The American College of Critical Care Medicine has stated which of the following about critical care pharmacists?

- A: Pharmacists are an integral part of the intensive care unit team
- B: A dedicated pharmacist should participate in daily multidisciplinary
- C: Pharmacists who participate in critical care rounds require special
- D: A dedicated pharmacist who participates in daily multidisciplinary

Studies about the impact of pharmacists in critical care settings have concluded which of the following?

- A: The majority of hospitals have critical care clinical pharmacist coverage
- B: The number of interventions made by pharmacists per day plateaued
- C: The number of preventable adverse drug events due to prescribing
- D: Medication related costs are increased when pharmacists round with

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-325L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DEVELOPMENT OF A USP <800> IMPLEMENTATION PLAN AT A MULTISITE HEALTH SYSTEM: RISK ASSESSMENT OF HAZARDOUS DRUGS AND USE OF PROPER PERSONAL PROTECTIVE EQUIPMENT

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To protect patients, healthcare personnel, and the environment, the United States Pharmacopeial Convention developed a new chapter, USP General Chapter <800>, which defines processes intended to minimize exposure to hazardous drugs in healthcare settings. An essential step in the implementation process at a healthcare institution is to determine which drugs handled at the institution are affected by USP <800> standards and the necessary containment requirements to maximize safety and minimize exposure to the hazardous agents. The purpose of this project is to assess the risk of handling hazardous drugs utilized by our institution, identify proper personal protective equipment for each stage of the handling of hazardous drugs, and implement necessary changes into appropriate workflows. A task force of individuals representing multiple disciplines was formed to determine appropriate actions for implementation of USP <800> standards. A gap analysis was performed to determine which standards the institution is currently compliant with and to determine what changes need to be implemented in order to meet USP <800> standards. An assessment of risk of drugs included on the current National Institute for Occupational Safety and Health List of Antineoplastic and Other Hazardous Drugs in Healthcare Settings was performed to determine which drugs will be handled according to USP <800> standards and which drugs will be handled with alternative containment strategies as defined by the institution. Personal protective equipment requirements will be determined and implemented based upon the institution's assessment of risk. Personnel who handle hazardous drugs will be educated on the use of proper personal protective equipment pertinent to their discipline. Appropriate containment requirements for hazardous drugs will be integrated in the electronic medical record system. The results and conclusions will be presented at the 2017 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify drugs that are affected by USP General Chapter <800> standards and how to assess risk of exposure

Describe personal protective equipment requirements for the receipt, compounding, administration, and disposal of hazardous drugs

Self Assessment Questions:

Which of the following drug products and dispensing actions must follow all containment requirements specified by USP <800>?

- A: Counting colchicine tablets to be repackaged
- B: Repackaging methotrexate tablets
- C: Drawing doxorubicin solution into a syringe
- D: Injecting fosphenytoin solution into a bag of normal saline

Which of the following is correct regarding personal protective equipment to be worn for compounding-related activities involving hazardous drugs?

- A: Gowns may have an open front
- B: Two pairs of shoe covers must be donned before entering the C-S
- C: Chemotherapy gloves should be changed every 60 minutes unless
- D: Eye protection must be worn when compounding hazardous drugs

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-860L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF PHARMACIST-LED OUTPATIENT MANAGEMENT OF MINOR BLEEDING EVENTS ON THE RATE OF EMERGENCY DEPARTMENT VISITS FOR PATIENTS ON VITAMIN K ANTAGONIST

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Purpose: Minor bleeding events are common side effects for patients taking oral anticoagulation therapy, such as warfarin. This study evaluates the utility of a recently updated protocol in the outpatient Anticoagulation Therapy Unit (ATU) at Parkview Health allowing pharmacists to manage minor bleeding events. **Methods:** During annual protocol review, a new section was added to provide guidance for ATU pharmacists in managing minor bleeding events, which included bleeds from nose, gums, hemorrhoids, or small skin lacerations. This retrospective chart review will evaluate the rate of ATU patients that present to the ED with a minor bleeding event during the pre- and post-intervention timeframes which are defined as October 1, 2015 - March 31, 2016 and October 1, 2016 - March 31, 2017, respectively. Subjects were eligible for inclusion if they were at least 18 years of age, presented to the ED at one of two hospitals in the Parkview Health system, were active patients of the ATU, and on warfarin therapy with a goal International Normalized Ratio (INR) of 2.0-3.0 or 2.5-3.5. Subjects were excluded if they were pregnant or admitted after ED presentation. The primary outcome is the change in rate of ATU patients that present to the ED with minor bleeding events before and after the intervention. Descriptive statistics will describe the number of ATU patients educated on the protocol revisions, number of patients with a minor bleed managed by the ATU, and a comparison of estimated patient cost for visit to the ATU vs ED. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify non-pharmacologic recommendations to manage minor bleeding events.

Describe the benefit of managing minor bleeding events in the outpatient setting compared to the emergency department (ED).

Self Assessment Questions:

What is a recommendation for a patient on warfarin that experiences frequent nose bleeds?

- A Apply pressure to top of nose
- B: Blow nose until cessation of bleeding
- C: Tilt head backward to stop blood from running out of nose
- D: Use a dehumidifier in the household

Which of the following is a possible benefit of managing minor bleeding events in an outpatient clinic rather than an emergency department?

- A Decreased patient cost
- B Increased patient satisfaction
- C Reduction in number of unnecessary visits to the emergency department
- D All of the above

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-313L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DEVELOPMENT, IMPLEMENTATION, AND EVALUATION OF A STANDARDIZED TOOL FOR PHARMACIST RECOMMENDATIONS RELATED TO INTRAVENOUS DIURETIC DOSING FOR PATIENTS WITH ACUTE DECOMPENSATED HEART FAILURE

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Purpose: The purpose of this project is to evaluate the implementation of a standardized intravenous diuretic dosing algorithm. This algorithm serves as a tool to guide pharmacist recommendations regarding dosing of intravenous diuretics for patients hospitalized with acute decompensated heart failure. **Methods:** A standardized intravenous diuretic dosing algorithm was developed based on published literature and provided to pharmacists at a community hospital. A baseline survey was conducted related to intervening on intravenous diuretics for patients with acute decompensated heart failure. Education on utilizing the dosing algorithm was then provided to pharmacists. During the post-intervention period, pharmacists used this algorithm to guide recommendations to physicians regarding intravenous diuretic dosing for patients with acute decompensated heart failure. Retrospective chart review will be performed for adult patients hospitalized with acute decompensated heart failure who received intravenous diuretics during the pre- and post-intervention periods. Analysis will also include a comparison of patients on whom pharmacists intervened versus those for whom recommendations were not made based on the dosing algorithm. Data collection will include 30-day readmission rates, length of stay, weight change, duration of intravenous diuretics, serum creatinine change, and evidence of hypotension based on systolic blood pressure. **Results and Conclusions:** Data collection is currently in process. Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the results of the CARRESS-HF trial as they relate to standardized intravenous diuretic dosing for acute decompensated heart failure.

Identify the benefits of pharmacists monitoring intravenous diuretics for patients with acute decompensated heart failure.

Self Assessment Questions:

The CARRESS-HF trial showed which of the following results for stepped pharmacologic therapy in patients with acute decompensated heart failure?

- A Increased rates of acute kidney injury compared to ultrafiltration.
- B: Decreased rates of acute kidney injury compared to ultrafiltration.
- C: Increased weight loss compared to ultrafiltration.
- D: Decreased weight loss compared to ultrafiltration.

Which of the following is a potential benefit of pharmacists actively monitoring intravenous diuretics for patients with acute decompensated heart failure?

- A Reduces the duration of intravenous diuretics.
- B Prevents acute kidney injury related to intravenous diuretics.
- C Helps identify physicians who are inadequately dosing intravenous
- D Ensures adequate and safe escalation of intravenous diuretic dosing

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-357L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

INCIDENCE OF CYTOMEGALOVIRUS INFECTION AMONG LIVER TRANSPLANT RECIPIENTS MAINTAINED ON A CYCLOSPORINE VS. TACROLIMUS-BASED IMMUNOSUPPRESSION REGIMEN

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Background: Cytomegalovirus (CMV) is the most common viral pathogen that affects patient outcomes after liver transplant. Potent immunosuppressive agents predispose patients to an increased risk of CMV infection. Despite this, there is no published data assessing the risk of CMV infection associated with the use of cyclosporine (CSA) vs. tacrolimus (FK) among liver transplant recipients. We aim to compare the incidence of CMV infection among liver transplant patients receiving CSA and FK at our center. **Methods:** Adult patients who received a liver transplant between 2/1/2007 and 7/15/2015 and subsequently developed CMV viremia within the first year post-transplant were eligible for inclusion in this single-center, retrospective cohort study. Patients were excluded if their immunosuppression regimen did not include CSA or FK. The primary outcome was development of CMV infection, defined as the presence of detectable CMV DNA in peripheral blood by polymerase chain reaction (PCR). Secondary outcomes included treatment success, time to viral eradication, and mortality. **Results:** Of 198 transplants performed, 110 patients received CSA and 77 patients received FK. Eighteen patients in the CSA group and 23 patients in the FK group developed CMV infection (16.4% vs. 29.9%; $p = 0.03$). No significant differences in rates of treatment success (58.3% vs. 61.5%; $p = 1.00$), mean time to viral eradication (16 vs. 21 days; $p = 0.13$), or mortality (22.2% vs. 8.7%; $p = 0.38$) were observed between the CSA and FK groups, respectively. Triple maintenance immunosuppression regimens that included corticosteroids were more common among the FK group than the CSA group (43.5% vs. 27.8%; $p = 0.35$).

Conclusions: Use of FK was associated with an increased incidence of CMV infection compared with use of CSA among liver transplant recipients at our center. In light of this, larger studies evaluating the incidence of CMV infection among patients receiving CSA and FK are warranted.

Learning Objectives:

Describe the direct and indirect effects of CMV infection on solid organ transplant recipients

Identify risk factors associated with the development of CMV infection in solid organ transplant recipients

Self Assessment Questions:

Which of the following is an indirect effect of CMV infection?

- A: Fever
- B: Leukopenia
- C: Gastrointestinal disease
- D: Predisposition to opportunistic infections

Which of the following is a risk factor for the development of CMV infection in solid organ transplantation?

- A: Male gender
- B: Chronic antibody mediated rejection
- C: CMV IgG D+/R- serostatus
- D: CMV IgG D-/R+ serostatus

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-572L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF ANTIDEPRESSANT USE IN PATIENTS IN THE PREVENTION AND RECOVERY CENTER FOR EARLY PSYCHOSIS CLINIC (PARC)

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Purpose: Schizophrenia is a complex mental illness with a multitude of signs and symptoms. These symptoms are categorized into three groups: positive, negative, and cognitive. Positive symptoms, such as hallucinations and delusions, are typically well managed with antipsychotic medications; however, negative symptoms, such as lack of motivation, are more difficult to treat. Twenty-five percent of patients with schizophrenia report having depressive symptoms and sixty percent of those patients endorse having at least one negative symptom. The treatment resistance of negative symptoms has forced providers to seek different agents to better manage patients with schizophrenia. As a result, antidepressants are prescribed to about thirty percent of patients with schizophrenia. However, the use of antidepressants in schizophrenia has not been well described in the literature. Existing data does not identify which class of antidepressants are the most efficacious and if adjunctive use of antidepressants causes exacerbation of psychosis or an increased incidence of adverse events. **Methods:** This retrospective study evaluated subjects treated in the Prevention and Recovery Center for Early Psychosis (PARC) clinic between July 2014 and June 2016 with a DSM IV, TR, and/or DSM 5 diagnosis of schizophrenia, schizoaffective, psychosis not otherwise specified (NOS) bipolar disorder, or depression with psychotic features to identify antidepressant prescribed, the dose of the antidepressant, and the diagnosis. The primary endpoint is the characterization of the use of antidepressants in the patient population at PARC. The secondary endpoints include the comparison of antidepressant use by diagnosis, the side effects/tolerability of the antidepressants, and adherence rates.

Results/Conclusions: Data collection is ongoing with results to be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the similarities between schizophrenia and depression.

Explain the differences between the American Psychiatric Association Guidelines and the Schizophrenia Patient Outcomes Research Team (PORT) Guidelines with respect to the use of antidepressants in the management of patients with schizophrenia.

Self Assessment Questions:

Which category of schizophrenia symptoms most closely aligns with the symptomatology of depression?

- A: Cognitive
- B: Positive
- C: Negative
- D: Depressive

Which of the below statements regarding the APA and PORT guidelines are correct?

- A: Both guidelines endorse the use of antidepressants for the management of negative symptoms
- B: Both guidelines do not support the use of antidepressants for the management of positive symptoms
- C: PORT guidelines find no evidence for antidepressant use in schizophrenia
- D: PORT guidelines find no evidence for antidepressant use in schizoaffective disorder

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-604L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

SLEEP IN A PHARMACY RESIDENCY ON CALL PROGRAM

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Purpose: According to a 2011 survey of residency program directors, 138 PGY1/PGY2 residency programs included an on call component, with 74% including overnight coverage. While studies exist evaluating the impact of overnight, in-house on call programs in other healthcare disciplines, little information exists representing the effect of these programs on pharmacy residents. The primary purpose of our study is to determine the influence of overnight, in-house on call programs on sleep and sleep quality in pharmacy residents and to understand the impact of sleep quality on resident sleepiness following an overnight call shift.

Methods: Our single-center, prospective observational cohort study included PGY1 and PGY2 residents at the University of Kentucky for whom informed consent was obtained. Sleep quality was assessed through the utilization of FitBit Flex devices worn by the residents on the night prior to their call shift, the night of their call shift, and the night following their call shift. Residents are scheduled for overnight call shifts from 7:00 pm to 7:00 am. Sleepiness was assessed via the Epworth Sleepiness Scale, completed by each resident the morning of their overnight call shift and the morning following their overnight call shift. We utilized univariate and multivariate linear regression analysis to assess the differences in sleep and sleep quality between pre-call, call, and post-call shifts, and to assess the relationship between sleep quality and sleepiness. Additionally, a mixed-model analysis was employed to account for variability between and across participants throughout the study period. Results and Conclusions: Data collection and analysis is ongoing. Preliminary data from September to December showed residents had a total of 1,123 overnight calls, averaging approximately 10 calls per shift. We captured sleep quality and sleepiness data for 105 overnight call shifts during this time period. Results and conclusions will be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the impact of overnight, in-house on call programs on pharmacy resident sleep and sleep quality.

Explain the relationship between pharmacy resident sleep and sleep quality and pharmacy resident sleepiness following an overnight, in-house on call shift.

Self Assessment Questions:

Based on a survey of PGY1 and PGY2 residency program directors in 2011, what percent of residency on call programs included an overnight component?

- A 74%
- B: 60%
- C: 44%
- D: 25%

Which of the following statements is true?

- A Many institutions rely on pharmacy residents to expand clinical ph:
- B Numerous studies have evaluated the impact of overnight, in-hous
- C The expansion of clinical pharmacy services has shown to decrea:
- D A and C

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-916L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

THE EFFECT OF A PENICILLIN SKIN TEST ON PATIENTS WITH A PENICILLIN ALLERGY IN A COMMUNITY HOSPITAL.

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Purpose: The purpose of this project is to implement a penicillin skin test to allow providers to safely utilize penicillin and other -lactam antibiotics in patients with a history of a penicillin allergy.

Methods: Protocol for administration of a penicillin skin test was developed for patients with a penicillin allergy. Inclusion criteria to receive this test are: patient is 18 years or older, patient reports a penicillin allergy or patient's chart indicates a history of penicillin allergy, penicillin or -lactam antibiotics are considered first-line treatments for the patient's disease state. Exclusion criteria are: patients with a confirmed history of an anaphylactic reaction to penicillin or -lactam antibiotics within the last 5 years, patients with a history of severe skin reactions such as but not limited to Stevens-Johnson syndrome (SJS), Toxic Epidermal Necrolysis (TEN), drug rash with eosinophilia and systemic symptoms (DRESS), patients with allergic reactions to previous administrations of the penicillin skin test, and pregnant patients. This project consists of retrospective chart review and was exempt from the Institutional Review Board. A retrospective chart review will be conducted for up to 150 hospitalized patients between January and July 2017. All patients that meet the criteria for the penicillin skin test and consent to receiving the test will be selected. The prospective chart review will evaluate the efficacy, safety, and cost of the antimicrobial regimen before and after the penicillin skin test. Results/Conclusion: Will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the importance of a penicillin skin test in patients with a penicillin allergy.

Identify the key components in implementing a penicillin skin test protocol.

Self Assessment Questions:

Which of the following are possible advantages of a penicillin skin test?

- A Decreased rates of Methicillin-resistant Staphylococcus Aureus (MRSA)
- B: Decreased antibiotic resistance
- C: Decreased antibiotic expenditures
- D: All of the above

What is the recommended waiting time before reading the results of the puncture test?

- A 2 minutes
- B 5 minutes
- C 10 minutes
- D 15 minutes

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-301L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ROLE DESIGN AND INTEGRATION OF PHARMACISTS WITHIN AN ACADEMIC HEALTH SYSTEMS PRIMARY CARE CLINICS

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Background: The growth in value-based reimbursement in outpatient health services requires health systems to focus on primary care access and patient outcomes. Medication-related outcomes and cost measures make up a significant portion of government and private insurer incentive programs. As a result, pharmacist roles within the patient-centered medical home are growing, especially within integrated academic health systems, such as UW Health. The UW Health primary care clinic network consists of 37 primary care clinic locations. Pharmacists have historically not been an integral part of the patient care team in the primary care setting. Since 2012, several new pharmacist roles in the UW Health ambulatory care setting were developed, such as a Transitions of Care Pharmacist, an interdisciplinary asthma clinic pharmacist role, and the organization's first Ambulatory Care Pharmacy residency program. Piloting of pharmacist services by the ambulatory care pharmacy resident in primary care clinics demonstrated beneficial patient outcomes and clinician satisfaction. As a result, six additional FTE of pharmacists for implementation in the primary care clinic setting were approved by organizational leadership. **Purpose:** To integrate pharmacists within UW Health primary care clinics and evaluate the impact on patient access, medication-related health outcomes, and clinician satisfaction. **Objectives and Methods:** 1. Define specific pharmacist roles by selecting UW Health primary care clinic pilot sites and obtaining clinic leadership buy-in for roll out of pharmacist services. 2. Implement both remote and in-clinic pharmacist roles by developing standardized workflows in collaboration with primary care clinic patient care teams and UW Health primary care leadership. 3. Evaluate pharmacist impact on access, medication-related health outcomes, and clinician satisfaction via clinic performance data, self-reported interventions, and satisfaction surveys. **Results:** Results will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe two general patient populations that benefit from primary care pharmacist services

Define remote and in-clinic roles and responsibilities for pharmacists in multiple primary care clinics

Self Assessment Questions:

Name two patient populations that benefit from primary care pharmacist services due to changes in medication therapy and complex medication regimens:

- A: Pediatric and geriatric
- B: Post-hospital & SNF discharges and multiple co-morbidities
- C: Pre-surgical and post-surgical
- D: Insomniacs and patients with diabetes

When positioning pharmacy services within the primary care setting of an academic health-system, it is important to consider:

- A: Compounding services and aseptic technique
- B: Number of medication prior authorizations per clinic
- C: How to perform the same services of less expensive clinic staff
- D: Types of pharmacist services that can be completed in-person vs.

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-784L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DEVELOPMENT OF A SYSTEM-WIDE CONTROLLED SUBSTANCES DIVERSION RISK ASSESSMENT

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Purpose. Controlled substance abuse is a nationwide epidemic, and healthcare workers are not immune to this problem. It is important for health care systems to identify diversion risks in order to prevent patient harm and to protect the integrity of the organization. Controlled substance medication management workflows across an integrated health system were investigated to determine which processes are high risks. A gap analysis was simultaneously conducted to compare current practices with best practice guidelines developed by the American Society of Health-System Pharmacists (ASHP). The findings were presented to a system-wide Controlled Substances Diversion Prevention Program (CSDPP) Committee in order to prioritize gap closure based on risk level. **Methods.** A comprehensive risk assessment was conducted across Aurora Health Care using a Failure Modes and Effects Analysis (FMEA) and a gap analysis. Multi-disciplinary work teams were assembled to complete a business unit specific FMEA. Workflows were mapped separately for hospitals, clinics, and community pharmacies and presented as flowcharts. These teams worked together to brainstorm current prevention controls and potential risks for each process. A risk score was then assigned to processes using an adapted Institute for Healthcare Improvement (IHI) FMEA risk assessment tool. Finally, a gap analysis was conducted using a business unit specific survey which was developed using ASHP's CSDPP self-assessment guide. Survey responses were compiled to show the current state of system-wide prevention control strategies compared with established best practices. High risk workflows and gaps in current controls were presented to the CSDPP Committee. **Results/Conclusion.** Results and conclusion will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize important components of a risk assessment tool used in a FMEA

Describe the purpose of a gap analysis in a large scale risk assessment

Self Assessment Questions:

What does diversion severity refer to in this risk assessment tool?

- A: Amount of controlled substances
- B: Likelihood of getting fired
- C: Likelihood of harming a patient
- D: Cost of diverted goods

What was used to develop the best practices included in the site self-assessment?

- A: ASHP's Self-Assessment Guide
- B: Best practices developed by each pharmacy director
- C: The Controlled Substances Act
- D: DEA field office recommendations

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-816L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EFFICACY AND SAFETY OF LABETALOL AND HYDRALAZINE IN HYPERTENSIVE PATIENTS IN THE EMERGENCY DEPARTMENT

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Purpose: Roughly 20% of all Emergency Department (ED) visits are hypertension-related. For patients requiring intravenous (IV) therapy to lower their blood pressure, there are a few select agents that may be administered via IV push. For this reason, two commonly ordered antihypertensive agents are IV labetalol and hydralazine, however literature comparing their efficacy and safety for general use in the ED is limited. Therefore the purpose of this retrospective analysis is to evaluate the efficacy, defined as need for repeat doses and/or additional antihypertensive agents, and safety of IV labetalol and hydralazine for the treatment of hypertension in the ED. This evaluation of utilization trends in the ED may help guide clinicians with appropriate use of these agents in the future. **Methods:** This is a retrospective chart review including patients who received IV labetalol or hydralazine as an initial antihypertensive agent while in the ED. The primary outcome is the need for repeat doses and/or additional antihypertensives after 30 minutes, which will be stratified by initial drug choice and dose selected. Additional outcomes include percent changes in heart rate, percent blood pressure reduction following the first dose of either agent, and the number of total doses given. **Results/Conclusions:** Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review intravenous antihypertensives commonly used in the emergency department

Review literature for treatment of hypertension in the emergency department

Self Assessment Questions:

Which of the following is the recommended dosing schedule of labetalol for hypertensive emergency?

- A 10 – 20 mg IV push every 20 minutes
- B: 20 – 80 mg IV push every 10 minutes
- C: 10 – 60 mg IV push every 10 minutes
- D: 20 – 40 mg IV push every 20 minutes

Which of the following is correct?

- A Hydralazine has been proven to be superior to labetalol at lowering
- B Literature suggests that labetalol intravenous push is more effective
- C Hydralazine has been shown to be associated with higher rates of
- D Literature proposes that labetalol and hydralazine should be used

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-422L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

FIVE YEAR OUTCOMES WITH ALEMTUZUMAB INDUCTION THERAPY IN ELDERLY RENAL TRANSPLANT RECIPIENTS

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Background: The elderly population (≥ 65 years) comprise one fourth of patients on the waiting list for renal transplantation. Alemtuzumab use has increased over the past decade in the United States and is the induction agent of choice for most renal transplant recipients at Northwestern Memorial Hospital (NMH). Use of alemtuzumab in the elderly has been associated with an increased risk of transplant related complications and thus has been avoided in patients 65 years and older at NMH since October 2014. **Purpose:** To compare 5-year outcomes of patient and allograft survival between renal transplant recipients who are ≥ 65 years and those <65 years who received alemtuzumab induction. **Methods:** This is a single center, retrospective cohort study of patients who received alemtuzumab induction for renal transplantation. Patients 65 years and older who were transplanted between January 1st 2007 and October 31st 2009 were included. These patients were matched 1:1 with patients less than 65 years of age during the same time period by induction agent, donor type (living or deceased SCD, DCD or ECD), and transplant year. Patient and allograft survival at 1, 3 and 5 years post-transplant were examined. **Results:** The primary outcome of patient and allograft survival at 1, 3, and 5 years post transplant will be presented. Secondary outcomes including renal function, infectious complications, malignancy, and rejection rates will also be presented. **Conclusions:** It is expected that alemtuzumab use in elderly renal transplant recipients will not be associated with worse patient and allograft survival up to 5 years post-transplant when compared with a matched cohort.

Learning Objectives:

Describe the mechanism of action and monitoring parameters of alemtuzumab.

Explain the effect of alemtuzumab induction on patient and graft survival in elderly renal transplant recipients compared to non-elderly renal transplant recipients.

Self Assessment Questions:

What is the mechanism of action of alemtuzumab?

- A Reversible inhibitor of the 26S proteasome in mammalian cells
- B: Monoclonal antibody against CD52 antigen on B and T cells, most
- C: Monoclonal antibody against CD25 antigen
- D: Monoclonal antibody with a high binding affinity for the C5 protein

Which of the following statements is correct regarding side effects of alemtuzumab?

- A Serum sickness: Type III hypersensitivity
- B Mild cytokine-release syndrome, neutropenia, anemia, idiosyncratic
- C Neurotoxicity, hypertension, nephrotoxicity
- D Meningococcal infection, patients must receive meningococcal vac

Q1 Answer: B Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-371L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION OF A PHARMACY-DRIVEN INFLUENZA VACCINATION PROGRAM IN THE EMERGENCY DEPARTMENT

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With nearly 140 million annual visits nationally and access to a large number of underprivileged patients with chronic illnesses or limited contact with a primary provider, the emergency department is the ideal location to increase influenza vaccination rates among high risk individuals. The purpose of this study was to design and evaluate a multidisciplinary program to provide influenza immunizations to patients presenting to Froedtert's emergency department. The primary outcome looked at vaccination rates and secondary outcomes included screening rates and reasons why patients declined vaccination. From October 2016 through April 2017, all patients over the age 18 not being admitted to the hospital were screened by pharmacy personnel to determine eligibility for the influenza vaccine. For those patients that agreed to receive the vaccine, an order was placed by the pharmacist and the vaccine was administered by emergency department nursing staff prior to the patient discharging home. To date, 130 patients have been screened by pharmacy and fifty-five (42.3%) of these patients were already vaccinated. Of the remaining 75 eligible patients, 22 (29.3%) received the influenza vaccine prior to discharge. The most common reasons for declining the influenza vaccine included a perceived low-risk for contracting influenza (25.3%), fear of an adverse event from the vaccine (14.7%) and fear of needles (6.7%). This pilot program demonstrates the potential of a pharmacy-driven influenza vaccination service while also providing a public health service by increasing vaccination rates throughout the community.

Learning Objectives:

Recognize populations at high risk for developing complications related to influenza

Identify common reasons patients decline the influenza vaccine

Self Assessment Questions:

Which of the following populations is at high-risk for developing complications related to influenza?

- A: Adults under the age of 65 years
- B: Non-pregnant patients
- C: Patients with a weakened immune system (HIV, AIDS, cancer, etc)
- D: Patients with a history of GERD

Which of the following is a common reason for patients to decline the influenza vaccine?

- A: Fear of needles
- B: Already received the vaccine this year
- C: Do not believe they will get the flu this year
- D: All of the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-373L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

OUTPATIENT CANCER CENTER COST EVALUATION OF EXTENDED BEYOND USE DATING WITH A CLOSED SYSTEM TRANSFER DEVICE

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Purpose: New standards from the United States Pharmacopeia (USP), adopted by the Occupational Safety and Health Administration (OSHA), have specific safety suggestions for handling hazardous medications in the workplace. Bronson Battle Creek Cancer Care Center (BBC-CCC) is implementing the use of a closed-system transfer device (CSTD) to improve safety for the employees who handle these products, comply with these standards, and potentially reduce cost. In addition to meeting the USP standards for use of CSTD, there is an additional benefit of extending antimicrobial stability of the vial for up to seven days. Current compounding practices at BBC-CCC can lead to expensive antineoplastic and biologic products being wasted due to product stability concerns once the product is initially accessed. The main purpose of this study is to determine if the beyond use dating extension has a financial benefit in decreasing waste to offset the cost of implementation of CSTD. Methods: This study is a retrospective chart and drug purchase history review of the doses of antineoplastic and biologic products patients received in the BBC-CCC. Data is collected from June 2015 through June 2016 for the 3,000 most recent patient infusions. The primary outcome is the prospective cost savings from the use of a CSTD. Secondary objectives include a count of the total number of parenteral antineoplastic and biologic products compounded in the BBC-CCC, assessment of the antineoplastic and biologic waste, if there is a potential cost savings from being able to use larger bulk vials of products, estimated cost of CSTD implementation, and a survey of other Michigan hospitals use of CSTDs. Wipe testing will be done before and after CSTD roll-out to assess hazardous chemicals spread throughout the facility as a measure of employee safety. Results/Conclusion: Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain how a CSTD can be used to extend the beyond use dating of a sterile product.

Identify the USP <800> requirements for a CSTD.

Self Assessment Questions:

Closed system transfer devices can extend the beyond use dating of a product by which process?

- A: They protect the product from light
- B: They prevent the transfer of microbial contaminants into the vial
- C: They increase the stability of the compound
- D: They prevent other compounds mixing with and contaminating the

According to USP <800>, a true closed system transfer device will contain what from hazardous drugs during the compounding process?

- A: Drips
- B: Sprays
- C: Vapors
- D: All of the above

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-832L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

THE EFFECTS OF ADVANCED PHARMACY PRACTICE EXPERIENCE CHARACTERISTICS ON PGY1 RESIDENCY MATCH RATES

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Objective: To determine the impact of Advanced Pharmacy Practice Experience (APPE) characteristics on Post-Graduate Year-1 (PGY1) residency match rates

Study design: Retrospective cohort study

Methods: Data from students who graduated from a single College of Pharmacy and entered the PGY1 residency match in 2015 or 2016 will be included and stratified based on success in matching. These groups will be compared by APPE characteristics, including type of APPE, setting of APPE, type of preceptor, number of clinical rotations, and whether the site has a pharmacy residency program. Additionally, GPA and gender data will be collected. Data will be analyzed using chi square test for categorical data and unpaired t-test for continuous data.

Binomial logistic regression analysis will also be performed to identify significant factors that affect PGY1 residency match rates in two phases
Preliminary Results: Approximately 101 students are eligible for inclusion (58 matched, 43 unmatched). The results may assist faculty, preceptors, and mentors provide students guidance in choosing APPE rotations and may impact the way APPE rotation selection occurs within the College of Pharmacy.

Learning Objectives:

Describe the methods utilized to address the study question

Discuss preliminary results for the study and how these results may impact the APPE selection process

Self Assessment Questions:

Which of the following information was collected and analyzed for impact in the study?

- A Undergraduate major
- B: Type of IPPE rotation
- C: Setting of APPE rotation
- D: Grade for each rotation

Which of the following best describes how these results may benefit pharmacy students? Results may assist students with:

- A Selection of extracurricular activities
- B Selection of a PGY1 residency program
- C Selection of IPPE rotations
- D Selection of APPE rotations

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DEMOGRAPHIC AND SOCIOECONOMIC FACTORS ASSOCIATED WITH NONADHERENCE TO CHRONIC MEDICATIONS IN A MARKETPLACE POPULATION

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Purpose: On average, only 50 percent of patients with chronic disease adhere to their medications resulting in \$100 to \$300 billion in preventable health care costs. Pharmacy Quality Alliance (PQA) developed a measure specific to medication adherence that is included in the Quality Rating System (QRS) for Marketplace plans, called Proportion of Days Covered (PDC). The objective of our study is to identify demographic and socioeconomic factors associated with nonadherence to chronic medications in the Marketplace population.

Methods: This study is a retrospective cohort of BCBSM members enrolled in a Marketplace plan during 2015. Data source for explanatory variables (age, sex, index claim, cost share, plan type) is BCBSM pharmacy claims, with income and ethnicity data obtained from a proprietary marketing tool. PDC is calculated as the number of days a member is covered by medication divided by treatment period. Individuals with PDC less than 80 percent are classified as nonadherent to the therapeutic category (renin angiotension system antagonists, statins, or non-insulin diabetes). For each therapeutic category, differences in demographic and socioeconomic factors between adherent and nonadherent groups are assessed using chi-square test for categorical variables and t-tests for continuous variables. Associations between demographic and socioeconomic factors with nonadherence are evaluated with a linear model-based regression analysis for each category. Results: A total of 9,452 members were analyzed. Member age, pharmacy type, and day supply were statistically different between nonadherent and adherent members. Age and 30-day supply were associated with nonadherence across all three therapeutic categories (renin angiotension system antagonists, statins, or non-insulin diabetes). Members taking all three categories had the highest adherence rates. Conclusion: Certain factors associated with nonadherence are modifiable and can be addressed through benefit design and clinical programs. To our knowledge this is the first study assessing factors associated with nonadherence in the Marketplace population.

Learning Objectives:

List factors associated with nonadherence to chronic medications in a Marketplace population.

Identify an eligible member for PDC measure and explain how PDC is calculated.

Self Assessment Questions:

Which of the following factors were shown to be associated with nonadherence to chronic medications in a Marketplace population?

- A Number of pharmacies used
- B: 30-day supply
- C: Race
- D: Number of drugs

Which of following patients would be eligible for the Diabetes Medications PDC measure?

- A Member on metformin and insulin glargine who fills both regularly
- B Member on glyburide and liraglutide who had a gap in enrollment
- C Member on metformin who pays cash as a result of a discount or 1
- D Member on canagliflozin and metformin who filled each only once

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-768L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ASSESSING PRESCRIBER AND PHARMACIST PERCEPTIONS OF ELECTRONIC PRESCRIBING OF CONTROLLED SUBSTANCES

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Purpose: In 2010, the United States Drug Enforcement Agency (DEA) issued a new rule that allowed for electronic prescribing of controlled substances (EPCS). Due to security concerns, unreliable technology, and increased costs associated with EPCS implementation, many health-systems have been slow to adopt EPCS. The objective of this study is to assess both pharmacist and prescriber perceptions of EPCS and evaluate the impact EPCS implementation has on controlled substance prescribing. **Methods:** A quality improvement study was conducted pre and post implementation of electronic prescribing of controlled substances (EPCS). EPCS was piloted in a group of 16 prescribers, including advanced nurse practitioners (APNs) and attending physicians. An electronic, multiple-choice survey was distributed to the 16 prescribers prior to EPCS implementation and one month post-implementation. A second survey was sent to 140 inpatient and outpatient pharmacists. The surveys were sent via internal e-mail at a free-standing pediatric institution. The questions assessed current prescribing practices of controlled substances, experience with patients needing to return to the hospital due to uncontrolled pain, perceived risks and benefits of EPCS, and perceptions of the impact EPCS may have on the opioid epidemic. Surveys were open for two weeks and descriptive statistics were used to analyze the results. Further data was gathered from internal reports; including prescriptions filled at the hospital's outpatient pharmacy and hospital readmissions. Historical data was pulled to compare the number of controlled substances prescribed, the average number of days prescriptions were written for, and the number of prescriptions picked up pre and post EPCS implementation.

This project was deemed quality improvement and, therefore, is considered IRB-exempt. **Results/Conclusion:** Data collection and analysis is ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify the advantages and disadvantages of electronic prescribing controlled substances (EPCS).
Recognize the challenges of implementing an EPCS system effectively.

Self Assessment Questions:

What are some perceived benefits of EPCS?

- A Decrease in drug diversion
- B Reduce medication errors
- C Improve efficiency
- D Both A and B

What is the national average of prescribers using EPCS when prescribing controlled substances?

- A Less than 10%
- B 10-25%
- C 26-50%
- D Greater than 50%

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-819L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

OUTCOMES FOLLOWING SOLITARY PANCREAS TRANSPLANTATION - DO STEROIDS MATTER?

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Background: Corticosteroids remain the cornerstone of maintenance immunosuppression following pancreas transplantation but are associated with complications. Currently, only 35% of pancreas programs are steroid-free. Readmission rates at 6 and 12 months following transplantation range from 50-70%. The purpose of this study was to assess if there is a difference in hospital readmission rates, rejection, patient and graft survival between steroid-free and steroid maintenance regimens in pancreas transplants. **Methods:** This study queried the Scientific Registry of Transplant Recipients (SRTR) for recipients of pancreas transplant alone (PTA) from January 2005 to March 2015. Primary endpoint was hospital readmission rates at 6 and 12 months for patients on maintenance steroids versus patients on steroid-free protocols. Secondary endpoints were rate of rejection, graft status and patient survival. Data were analyzed using Statistical Analysis Software. **Results:** At 6 months, 974 patients received PTA and had documented information in SRTR regarding hospitalizations and steroid use. Hospitalizations occurred during the first 6 months after transplant for 64.7% of patients in steroid-free group vs. 72.69% who received maintenance steroids ($p=0.0075$). At 12 months, 887 patients had documented information in SRTR; steroid-free patients had less reported hospitalizations vs. steroid group (46.3% vs. 60.5%, $p<0.0001$). There was no difference in acute rejection rates between steroid free vs. steroid group at 6 months (16.6% vs. 16.2%, $p=0.8595$) or 12 months (9.30% vs. 7.57%, $p=0.3538$). There was no difference between groups in graft failure and patient mortality at 6 and 12 months. **Conclusion:** Our registry analysis suggests that maintenance steroids are associated with more hospitalizations in PTA recipients in the first 6 and 12 months while having no impact on acute rejection rates. However, study was limited by inconsistent reporting to SRTR. Additional research is needed to identify potential factors increasing rates of hospitalization in this population.

Learning Objectives:

Identify short and long term complications of corticosteroids used in maintenance immunosuppression
Describe common causes for hospital readmission following pancreas transplant

Self Assessment Questions:

Which of the following is a complication associated with corticosteroids?

- A Hypotension
- B Impaired wound healing
- C Deep vein thrombosis
- D Hypoglycemia

Which of the following is not a common reason for hospital readmission following pancreas transplant?

- A Dehydration
- B Pancreatitis
- C Hypertension
- D Infection

Q1 Answer: B Q2 Answer: C

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SODIUM BICARBONATE USE FOR IN-HOSPITAL CARDIAC ARRESTS

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Purpose: The 2015 American Heart Association Advanced Cardiac Life Support (ACLS) Guidelines recommend against sodium bicarbonate for routine use during cardiac arrest, unless the patient has a preexisting metabolic acidosis, hyperkalemia, or tricyclic antidepressant overdose. Sodium bicarbonate may inactivate simultaneously administered catecholamines such as epinephrine, produce excess carbon dioxide that can contribute to intracellular acidosis, lead to hyperviscosity with the large sodium load causing decreased perfusion, worsen coronary perfusion, and cause overshoot alkalosis. Numerous trials have evaluated mortality after cardiac arrest when sodium bicarbonate is used; however, there is a paucity of in vivo data regarding the interaction of epinephrine and sodium bicarbonate during cardiac arrest. This evaluation will aim to identify sodium bicarbonate's effect on epinephrine usage during cardiac arrest in addition to several secondary outcomes to better understand sodium bicarbonate's place in therapy. **Methods:** This is a retrospective, cohort evaluation of patients with in-hospital cardiac arrest (IHCA) at the University of Illinois Hospital from January 2014 to present. Patients ≥ 18 years old, admitted with documented IHCA, and who received ACLS will be included. Patients treated with sodium bicarbonate for documented tricyclic antidepressant overdose or hyperkalemia, with a pH < 7 prior to cardiac arrest, or who had a previous cardiac arrest during the same admission will be excluded. Patients will be divided into two groups, those who received sodium bicarbonate versus those who did not. The primary endpoint is the number of epinephrine 1 mg intravenous/intraosseous doses administered. Secondary endpoints include presenting cardiac rhythm, rate of return of spontaneous circulation, number of other cardiac arrest medications used during the code, total amount of sodium bicarbonate used, duration of cardiac arrest, discharge from the hospital, and discharge disposition. **Results:** Pending. **Conclusions:** To be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify the mechanism of action of sodium bicarbonate when used during in-hospital cardiac arrests and when it is recommended to be used according to current ACLS guidelines.

Describe the potential benefits and risks when sodium bicarbonate is used for in-hospital cardiac arrests.

Self Assessment Questions:

In what clinical scenarios is sodium bicarbonate recommended to be used during cardiac arrests according to the 2015 ACLS guidelines?

- A The patient has a preexisting hyperkalemia
- B: The duration of cardiac arrest has been greater than 15 minutes
- C: The patient had a pH that was within normal limits before the cardiac arrest
- D: Sodium bicarbonate is always recommended to be used during cardiac arrests

Which of the following is NOT a potential risk of using sodium bicarbonate during a cardiac arrest?

- A Sodium bicarbonate may paradoxically contribute to worsening of acidosis
- B Sodium bicarbonate may compromise coronary perfusion pressure
- C Sodium bicarbonate may cause a paradoxical hyperkalemia
- D Sodium bicarbonate may inactivate simultaneously administered catecholamines

Q1 Answer: A Q2 Answer: C

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PHARMACISTS BASELINE KNOWLEDGE AND PERCEPTIONS OF TECH-CHECK-TECH (TCT) IN THE COMMUNITY PHARMACY SETTING

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Purpose: Tech-Check-Tech (TCT) is an emerging work flow model which is intended to reduce the need for the pharmacist to perform technical functions. Within the TCT model, pharmacists review each patient's prescription for accuracy as to how it was transcribed into their pharmacy system and conduct prospective drug utilization reviews (DURs) to assess both safety and efficacy of each prescription prior to filling. The TCT technician will check that the prepared medication is in fact the medication that the pharmacist has previously approved. Since this has not been researched extensively within the community pharmacy setting, the objective of this study is to examine the baseline knowledge, perceptions of their role, job security, and professional liability of TCT among community pharmacists. This information can then be used to help transform the structure and laws surrounding TCT to foster a program to allot additional time for the pharmacist to focus on clinical services leading to better patient care and higher reimbursement. **Methods:** This is an anonymous, prospective, multi-site, survey. Pharmacists, both full and part time, working at thirty-six stores in Chicago and the surrounding suburbs are eligible to participate. Pharmacists will be asked to complete an eleven Likert-scale survey based on their present knowledge and perceptions of the qualification and training of participating technicians, the implementation and safety of TCT, and pharmacists' role in this process. An additional four multiple choice questions will be used to gather pharmacists' demographic information. Each participant will have the opportunity to state additional comments or concerns they may have in a free response section. Data will be compiled and analyzed using SPSS software. Descriptive statistics will be used to describe study results. **Results/Conclusions:** Research is in progress. Results and conclusion will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Indicate the specific task technicians are allowed to complete when performing TCT.

Identify the limitations of TCT when implemented.

Self Assessment Questions:

When performing TCT, a specially trained pharmacy technician is not permitted to check

- A Drug quantity.
- B: Accuracy of drug and dose.
- C: Drug interaction.
- D: Packaging.

Which pharmacy practice site has more data on the safety and efficacy of TCT?

- A Hospital
- B Retail chain
- C Independent community
- D Mail order

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-846L04-P

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(if ACPE number listed above)

OPTIMIZING ANTIMICROBIAL PRESCRIBING IN A HOSPITAL-BASED PULMONARY CLINIC

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Purpose: Inappropriate antimicrobial prescribing is a major contributor to antibiotic resistance. The Centers for Disease Control and Prevention (CDC) estimates that up to half of the antibiotics prescribed in an inpatient hospital setting may be unnecessary, while thirty-percent of prescriptions written in emergency departments and private physician offices may be inappropriate. Drug resistance and multi-drug resistance can lead to treatment failure and become a financial burden to both patients and the health care system with diminishing quality of life and loss of productivity. Thus, inappropriate prescribing, regardless of clinical setting, can cause significant patient morbidity and mortality. The purpose of this study is to assess current antimicrobial prescribing habits in a hospital-based pulmonary clinic in order to develop, implement and measure the impact of a targeted educational intervention on antimicrobial prescribing. This study seeks to test the hypothesis that prescribers in the pulmonary clinic would benefit from a provider-directed intervention strategy regarding antimicrobial prescribing practices as defined by a change in the portion of inappropriate antimicrobial prescribing pre- and post-intervention. **Method:** This quasi-experimental study was approved by the Henry Ford Hospital Institutional Review Board. Pulmonary clinic patients aged greater than 18 years and seen at the Detroit campus with at least one new diagnosis of a respiratory tract and/or pulmonary infection regardless of whether or not an antimicrobial agent was prescribed will be examined. Subjects will then be grouped according to whether antimicrobial prescribing took place prior to or after the implementation of educational programs to improve prescribing patterns

Preliminary results to support/Conclusion reached: Data collection and analysis will be presented at the Great Lakes Conference.

Learning Objectives:

List characteristics of appropriate antimicrobial prescribing in the ambulatory care setting

Identify possible interventions for outpatient antimicrobial stewardship

Self Assessment Questions:

It is estimated that what percentage of adult patients diagnosed with acute bronchitis in the United States from 2008 to 2012 were prescribed antibiotics despite little clinical evidence for antibiotics

- A: 7%
- B: 12%
- C: 75%
- D: 89%

Proven evidence-based methods to optimize antimicrobial therapy include:

- A: Audit and feedback
- B: Academic detailing
- C: Clinical decision support
- D: All of the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-629L01-P

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REDUCING THE RISK OF QT INTERVAL PROLONGATION WITH CLINICAL DECISION SUPPORT

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Purpose: QT interval prolongation is a significant risk factor for Torsades de Pointes (TdP), a potentially lethal cardiac arrhythmia. Documentation of QT prolongation factors exists in multiple areas of the electronic health record (EHR), making it difficult for clinicians to determine when the benefit of a medication outweighs its risk of QT prolongation. Other institutions have successfully utilized electronic alerts to reduce the incidence of QT prolongation and inappropriate prescribing of QT-prolonging medications. Current QT drug-drug interaction alerts at Froedtert & the Medical College of Wisconsin are nonspecific and are overridden frequently. The purpose of this project is to design, build, implement, and evaluate the impact of a patient-specific clinical decision support tool for QT prolongation management. **Methods:** Utilizing a previously validated QT prolongation risk score, an alert was designed to trigger during order entry or verification of a QT-prolonging medication for those patients deemed to be at risk of QT prolongation. Redundant third-party knowledge vendor QT alerts were also filtered. **Study design** is quasi-experimental, with pre-intervention data collection examining patients admitted from February 2016 through April 2016. Post-implementation data collection took place from February 2017 through April 2017, for a total of 1230 patients across both groups. The primary outcome is incidence of corrected QT intervals greater than 500 ms or an increase of 60 ms or greater from admission value at any time during hospitalization. Secondary outcomes include: rates of QT-prolonging medication prescribing, incidence of TdP, percentage of alerts overridden, volume of alerts triggered, percentage of patients with EKGs ordered after alert override, and percentage of alerts with associated pharmacist documentation. **Results/Conclusion:** Data collection and analysis are ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify risk factors for the development of QT prolongation

Describe strategies for providing patient-specific QT prolongation decision support in the electronic health record

Self Assessment Questions:

Which of the following is a risk factor for the development of QT prolongation?

- A: Age under 18 years
- B: Rheumatoid Arthritis
- C: Low serum potassium
- D: Constipation

Which of the following medications is not likely to trigger a QT prolongation drug-drug interaction alert?

- A: Ondansetron
- B: Citalopram
- C: Quetiapine
- D: Magnesium

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-924L05-P

Activity Type: Knowledge-based Contact Hours: 0.5
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PHARMACIST ASSISTED BENZODIAZEPINE AND ZOLPIDEM TAPER IN A PRIMARY CARE POPULATION ON CONCURRENT OPIOIDS

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Purpose The rates of overdoses resulting from combinations of central nervous system (CNS) depressants such as benzodiazepines, zolpidem and opioids are rising at epidemic rates. However, optimal management of medical conditions such as anxiety, insomnia, and pain pose time consuming and complex challenges to many clinicians. Pharmacists in the Veterans Affairs patient-aligned care team (PACT) successfully manage chronic conditions such as hypertension, diabetes, and dyslipidemia in primary care clinics. This study was conducted to gauge the efficacy of a clinical pharmacist to reduce the use of benzodiazepine and zolpidem in veterans on concomitant opioids. **Methods** This study was conducted at the Veterans Affairs Community-Based Outpatient Clinic (CBOC) in Rockford, Illinois. From a primary care providers panel of patients, thirty-four patients were identified on concomitant benzodiazepine, zolpidem, and/or opioids. All patients received a phone call from a clinical pharmacist to provide education on medication risks and to assist with those interested in tapering. The daily dose of benzodiazepines (in diazepam equivalents) and zolpidem were measured intermittently throughout the study period. **Results** Data collection is ongoing with results pending. **Conclusion** Clinical pharmacists have been successful in managing chronic medical conditions in the primary care setting and can play a pivotal role in reducing the nationwide prevalence of concurrent benzodiazepine, zolpidem, and opioid use. From the unique vantage point as drug experts, pharmacists are able to offer pharmacologic and non-pharmacologic alternatives to anxiety and insomnia management with the flexibility to monitor patients closely throughout the taper period.

Learning Objectives:

Name the risks associated with combining benzodiazepines, zolpidem, and opioids

Identify the role of a clinical pharmacist in guiding benzodiazepine and zolpidem tapers

Self Assessment Questions:

Which of the following is a commonly fatal combination?

- A Opioid and cannabis
- B: Opioids and gabapentin
- C: Benzodiazepines, opioids, and alcohol
- D: Benzodiazepines and stimulants

What role can a clinical pharmacist play in tapering of benzodiazepines or zolpidem?

- A Create an individualized taper plan
- B Provide timely follow-up
- C Recommend non-pharmacologic therapy
- D All of the above

Q1 Answer: C Q2 Answer: D

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EVALUATION OF TIME SPENT BY PHARMACISTS AND NURSES BASED ON THE TIMING OF PHARMACIST INVOLVEMENT IN MEDICATION HISTORY COLLECTION

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Background: Medication reconciliation is addressed as a 2017 National Patient Safety Goal by the Joint Commission. This goal requires a good faith effort be made in collecting an accurate medication history. Although previous studies have shown the benefits of pharmacy involvement in gathering medication histories at time of admission, institutions may be charged with justifying resource allocation.

Purpose: The primary objective is to evaluate the difference in time spent by pharmacists and nurses based on the timing of pharmacist involvement in medication history collection. **Methods:** This prospective, single centered observational study compared medication history times in adult patients in the emergency department and on medical floors admitted through the emergency department. The primary outcome was the composite of three time components; time spent by: the interviewing pharmacist, the admitting floor nurse, and the pharmacist verifying inpatient admission orders. Interviewing pharmacist time spent included the patient interview, medication clarifications, and updating the admission medication list. Nursing time spent was assessed through surveys that were completed when the nurse updated the admission list. Verification time was determined through the electronic medical record. Predefined secondary outcomes were the individual components of the primary outcome and the number and types of documentation errors a pharmacist caught in the patients on a medical floor. Subgroup analysis on patients admitted directly from an outside facility was performed. **Results and Conclusions:** Results and conclusions will be presented at the 2017 Great Lakes Residency Conference.

Learning Objectives:

Discuss the time expended by nurses and pharmacists on accurate medication history collection in patients admitted from the emergency department, based on timing of the pharmacist interview.

Identify potential limitations in conducting a time-based study of medication history collection.

Self Assessment Questions:

Which of the following statements is/are correct? (Select ALL that apply)

- A It takes less than 10 minutes on average to perform accurate medication history collection
- B: An extended care facility medication list should be assumed to be accurate
- C: A common type of documentation error in medication history collection is missing medications
- D: If the patient is the primary source of information, a secondary source should be used to verify

What phrase best describes the medication history time difference between patients in the emergency department (ED) and patients on medical floors admitted through the ED?

- A It takes MORE THAN 5 extra minutes if a patient is interviewed IN the ED
- B It takes LESS THAN 5 extra minutes if a patient is interviewed IN the ED
- C It takes LESS THAN 5 extra minutes if a patient is interviewed ON the medical floor
- D It takes MORE THAN 5 extra minutes if a patient is interviewed ON the medical floor

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-968L04-P

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BROAD SPECTRUM ANTIBIOTIC TREATMENT FOR HEALTH CARE ASSOCIATED PNEUMONIA (HCAP): AN ANALYSIS OF ANTIBIOTIC USE, TRANSITIONS OF CARE, AND PATIENT OUTCOMES

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Purpose:

The purpose of this study is to assess the current treatment practices of health-care associated pneumonia (HCAP) patients at Northwestern Memorial Hospital (NMH). The objective of this is to assess the patterns of antibiotic utilization through transitions of care from the emergency department (ED) in patients with a presumptive diagnosis of HCAP.

Methods:

The primary outcome of this epidemiologic study is the incidence of antimicrobial escalation, de-escalation or discontinuation when the patient transitions from the ED to the floor. Secondary outcomes include the percent of patients receiving broad spectrum antimicrobial therapy who meet criteria for HCAP based on the 2005 IDSA Guidelines, the length of therapy in patients started on broad spectrum therapy compared with those not started on broad spectrum therapy, the percent of patients started on appropriate empiric antimicrobial therapy and the percent of patients in which antibiotics are appropriately discontinued after clinical improvement within 72 hours in the setting of negative culture results. Appropriate antibiotics will be defined as antibiotics which are active against the offending organism in culture positive infections. Patients were included if they received an antibiotic with an indication for HCAP. Patients were excluded if they were <18 years of age, met criteria for sepsis, immunosuppressed, received chemotherapy within last 30 days, pulmonary tuberculosis, and infections with non-pulmonary sources. Data collected will include past medical history, risk factors for multi-drug resistant pneumonia, vital signs, lab values, imaging, microbiologic results, antibiotic selection, administration, and changes, and length of therapy.

Results: TBD

Conclusion: TBD

Learning Objectives:

Explain Explain the changes in 2016 IDSA guidelines as they relate to health-care associated pneumonia (HCAP)

Recognize Recognize the benefits of de-escalation of antibiotics

Self Assessment Questions:

Which of the following best describes the 2016 IDSA HAP/VAP Guideline recommendations with regard to Health-care Associated Pneumonia (HCAP):

- A Treatment recommendations were omitted from the updated HAP/
- B: All patients with HCAP be treated with broad spectrum antibiotics
- C: Treatment recommendations were stratified according to risk factc
- D: All patients with HCAP be treated with narrow spectrum antibiotics

Which of the following is a benefit of de-escalation therapy

- A Decrease exposure to broad spectrum antibiotics
- B Decrease oral antimicrobial options
- C Increase total duration of antimicrobial therapy
- D Increase rates of Clostridium difficile

Q1 Answer: A Q2 Answer: A

ACPE Universal Activity Number

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(if ACPE number listed above)

IMPLEMENTATION OF A VANCOMYCIN AUC/MIC DOSING PILOT

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Purpose: Vancomycin is a commonly used antibiotic within the inpatient setting. Indications for vancomycin include Methicillin-resistant Staphylococcus Aureus (MRSA)/Methicillin-sensitive Staphylococcus Aureus (MSSA) pneumonia, bacteremia, and endocarditis. Trough monitoring may be used to ensure appropriate dosing. Literature has shown that there is variability between trough and area under the curve (AUC) values, with some patients receiving higher doses of vancomycin which are not more efficacious and can lead to nephrotoxicity. Therefore, trough monitoring may not be the most appropriate measurement of vancomycin target levels in patients. The objective of this project is to optimize vancomycin exposure for patients with invasive staphylococcal infections by using novel pharmacokinetic monitoring to achieve a target vancomycin 24 hour vancomycin AUC of at least 400mg/L*hr. **Methods:** A prospective review of patients on vancomycin therapy for MRSA/MSSA pneumonia, bacteremia, endocarditis, and febrile neutropenia was conducted between October 2016 to present. Data was collected across two different sites which encompassed six intensive care units and three acute care floors. Vancomycin peaks and troughs were collected to determine AUC in relation to trough. The rate of 24 hour vancomycin AUC target attainment was collected along with patient specific factors that described the differences among patients.

Results: Data collection and analysis are currently being conducted. Results will be presented at the 2017 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify the main benefit of vancomycin AUC monitoring in comparison to trough monitoring.

Recognize barriers to vancomycin AUC data collection.

Self Assessment Questions:

Which of the following is the main benefit of vancomycin AUC monitoring when compared to trough monitoring?

- A Decreased nephrotoxicity
- B: Increased efficacy
- C: Decreased length of treatment
- D: Decreased length of stay

Which of the following are barriers to vancomycin AUC data collection?

- A Lack of patients with MRSA bacteremia/endocarditis/pneumonia
- B Lack of patients with MSSA bacteremia/endocarditis/pneumonia
- C Lack of patients with CNS infections
- D A and B

Q1 Answer: A Q2 Answer: D

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DEVELOPMENT, IMPLEMENTATION, AND ASSESSMENT OF A SITE OF CARE PROGRAM FOR SPECIALTY INFUSION PRODUCTS

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Purpose: Specialty infusion drugs used in the treatment of chronic, rare conditions are usually administered to patients in a physician office, hospital outpatient, or home setting. Variations in cost of therapies and services across such settings have led to challenges for health plans in managing health care costs while maintaining adherence. Redirection of patients to lower-cost sites of care has been shown to effectively reduce copay and health plan expenditures. The objectives of this study are to assess the outcomes of a novel site of care program in the success of site of care redirection, cost avoidance, and patient satisfaction. **Methods:** This prospective implementation, cost evaluation, and patient satisfaction study will collect claims data in order to identify patients receiving specialty infusion drugs that can be given safely and effectively at home. Patients will be identified between October 10, 2016 and June 1, 2017. The following data will be collected: patient age, gender, ethnicity, diagnosis codes, infused drug details, number of patients redirected to home infusion, costs for medical and pharmacy expenses, and patient satisfaction surveys. All data will be recorded without patient identifiers and maintained confidentially. Eligible therapies for redirection will include select alpha-1 proteinase inhibitors, enzyme replacement therapies, hemophilia factors, hereditary angioedema treatments, immune globulin products, and intravenous auto-immune therapies. Successful site of care redirection will be defined as the percentage of patients that achieve infusion site of care redirection from the physician office or hospital outpatient setting to home infusion upon their initial or second infusion dose. Total health care costs and infusion day costs will be measured using average monthly cost and per patient per month (PPPM) cost. Patient satisfaction will be assessed using a call-based survey. **Preliminary Results and Conclusions:** Preliminary results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the purpose of site of care programs for specialty infusion products.
Identify barriers to implementation of a site of care program.

Self Assessment Questions:

Which of the following is a potential reason for developing a site of care program for specialty infusion products?

- A: Increased health expenditure costs for health plans.
- B: Increased frequency of infusions in the hospital outpatient setting.
- C: Decreased health expenditure costs for health plans.
- D: Increased adherence to infusion therapies.

What is a potential barrier to implementation of a site of care program?

- A: Higher risk of infusion reactions.
- B: Resistance to site of care changes from patients and providers.
- C: Decreasing cost of specialty infusion products.
- D: Increased patient satisfaction with home infusion.

Q1 Answer: C Q2 Answer: B

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EVALUATION OF PREDNISONE 40 MG DAILY FOR TREATMENT OF ENGRAFTMENT SYNDROME FOLLOWING AUTOLOGOUS STEM CELL TRANSPLANT

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Purpose: Engraftment syndrome is a constellation of symptoms such as fever, skin rash, diarrhea, pulmonary infiltrates, hypoxia, and/or weight gain that can occur during the early phase of neutrophil recovery following hematopoietic stem cell transplant. It may result due to pro-inflammatory cytokine release and is generally very responsive to treatment with steroids. Currently, there is no consensus regarding criteria for diagnosis and only limited data available regarding steroid dosing for treatment. The purpose of this study is to evaluate for resolution of signs and symptoms of engraftment syndrome in patients prescribed prednisone 40 milligrams daily or its equivalent for treatment of the syndrome following autologous stem cell transplant. **Methods:**

The electronic medical record system was used to identify patients who received an autologous stem cell transplant between July 1, 2010 and July 1, 2016. Patients were included if they were greater than 18 years old, diagnosed with engraftment syndrome according to physician discretion, and received prednisone 40 milligrams daily or equivalent for its treatment. Patients were excluded if it was a second transplant, steroids were used for prevention of engraftment syndrome, or if any other dose of steroid was used for treatment. The primary outcome of this study is incidence of resolution of signs and symptoms identified that were consistent with engraftment syndrome. Secondary outcomes include time in days to symptom resolution, transfer to intensive care unit due to clinical deterioration associated with engraftment syndrome, requiring mechanical ventilation for respiratory failure associated with engraftment syndrome, cumulative dose and duration of steroids, and short-term complications possibly related to steroid therapy including hyperglycemia and hypertension.

Learning Objectives:

Identify clinical signs and symptoms that may be present in patients that develop engraftment syndrome.
Review the current literature for treatment of engraftment syndrome with steroids.

Self Assessment Questions:

Which of the following is a clinical symptom associated with engraftment syndrome?

- A: Hypotension
- B: Non-infectious fever
- C: Vomiting
- D: Headache

Engraftment syndrome is generally very responsive to treatment with which of the following?

- A: Diuretics
- B: Steroids
- C: Antibiotics
- D: Immunosuppressants

Q1 Answer: B Q2 Answer: B

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COMPARISON OF CONTROLLED SUBSTANCE DIVERSION MONITORING TOOLS

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In a Society where drug diversion is prevalent, pharmacy is tasked with the prevention and detection of drug diversion within the health system. Pharmacies utilize controlled substance diversion detection tools and software to help with proactive diversion efforts. There are many different proactive diversion products, but comparison of products is lacking. It is the purpose of this study, to develop and validate a process to identify the sensitivity, specificity and accuracy of two proactive diversion products to help determine the utility of each product and define best practice for the health system. All IV hydromorphone, IV fentanyl, oxycodone IR tablet, and oxycodone/APAP tablet removals from the two week review period will be obtained from the automated dispensing cabinets (ADC). These reports will be run on a mixed sample that closely mimics the hospitals makeup. All personnel that access selected controlled substances on the studied units during the review will be identified using ADC software. All select controlled substance removals for during the review will be compared to the medication administration record (MAR). Rx Auditor and CII Safe proactive diversion reports will be obtained. Individuals who are detected by the proactive diversion (PD) reports and fail to document administration on the MAR will be classified as a true positive. Individuals who are identified by the PD reports and have no omissions on the MAR will be classified as false positive. An individual will be labeled as a false negative if appearing on the PD reports along with a MAR omission and a true negative if not appearing on the PD report with no MAR omissions. These classifications will be used to calculate specificity, sensitivity, and accuracy for both Rx Auditor and CII safe PD reports. Results will be presented at the 32nd Annual Great Lakes Pharmacy Resident Conference at Purdue University

Learning Objectives:

Recognize the need for proactive diversion monitoring software comparison tool
Identify the difference between the two proactive diversion software tools

Self Assessment Questions:

What is the direct value of designing proactive diversion software comparison tools?

- A: Increase self-reported diverters
- B: Identify more diversion within your health-system
- C: Identify the more efficient and accurate monitoring tool
- D: Decrease number of diversion

When comparing the two monitoring tools, the accuracy calculation is used as an indicator for?

- A: Efficiency
- B: Efficacy
- C: Sensitivity
- D: The negative predictive value

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-885L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

INCIDENCE OF FEBRILE NEUTROPENIA IN OBESE BREAST CANCER PATIENTS RECEIVING PEGFILGRASTIM

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PURPOSE Common breast cancer chemotherapy regimens are associated with an increased risk of febrile neutropenia. Colony-stimulating factors are recommended for the prevention of febrile neutropenia in high-risk patients. Filgrastim utilizes weight-based dosing (5 mcg/kg), however its sustained-release formulation, pegfilgrastim, utilizes fixed-dosing (6 mg). The purpose of this study is to determine whether obese breast cancer patients who receive pegfilgrastim are at increased risk of developing febrile neutropenia when compared to non-obese patients. **METHODS** This study is a single-center, retrospective chart review being conducted at the University of Chicago Medicine. Inclusion criteria were an age of at least 18 years, a primary diagnosis of breast cancer, and an appropriate pegfilgrastim dose (6 mg). Those included were categorized as normal weight (BMI < 30), overweight (BMI 30-39), or obese (BMI ≥ 40). Patients with a hypersensitivity to filgrastim products or a primary diagnosis other than breast cancer were excluded. This primary outcome was the incidence of febrile neutropenia. **RESULTS** 442 eligible patients were identified as receiving pegfilgrastim between July 01, 2012 and May 19, 2016. 28 patients were noted as having a BMI of greater than 40 and were included in the obese group. 130 patients were categorized as overweight, and 278 patients as normal weight. 28 patients from each were randomly selected to make up the overweight and normal weight groups. The incidence of febrile neutropenia was 1 (3.6%), 2 (7.1%), and 1 (3.6%) of 28 in the normal weight, overweight, and obese research groups, respectively. **CONCLUSION** According to these results, overweight or obese patients are not at increased risk of febrile neutropenia in comparison to normal weight patients. Although the primary objective fails to differ between the groups, further analysis will determine whether overweight or obese patients are at higher risk of changes in therapy, hospital admissions, or antibiotic use.

Learning Objectives:

Explain the purpose of conducting this study.
Translate the implications of the results of this study.

Self Assessment Questions:

Why does filgrastim use weight-based dosing, whereas pegfilgrastim uses a standard dose?

- A: Pegfilgrastim is eliminated renally, whereas filgrastim utilizes neutrophils
- B: Filgrastim is eliminated renally, whereas pegfilgrastim utilizes neutrophils
- C: Pegfilgrastim undergoes hepatic activation, whereas filgrastim is a granulocyte colony-stimulating factor
- D: Filgrastim undergoes hepatic activation, whereas pegfilgrastim is a granulocyte colony-stimulating factor

Which of the following statements can be concluded from this study?

- A: Obese patients are at higher risk of developing febrile neutropenia
- B: Further research is needed to establish whether obese or overweight patients are at higher risk of developing febrile neutropenia
- C: Further research is needed to establish whether obese or overweight patients are at higher risk of developing febrile neutropenia
- D: Both B & C.

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-467L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF THE EFFICACY AND SAFETY OF PRESCRIBING PRACTICES FOR PATIENT-CONTROLLED ANALGESIA IN PEDIATRIC PATIENTS AT A LARGE ACADEMIC CHILDRENS HOSPITAL

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Consequences for uncontrolled pain in children can be serious and sometimes lifelong. Patient-controlled analgesia (PCA) use in children is often challenging due to safety concerns for adverse events such as respiratory depression, excessive sedation, and nausea. An interdisciplinary group of providers at Childrens Hospital of Illinois (CHOI) have formed a pain collaborative to discuss pain management strategies and practices. The group's efforts have included creating pain and sedation weaning algorithms, promoting "ouchless" stick methods, and reviewing approaches to PCA dosing and titration. The objective of this study is to determine if pain goals are being met quickly and safely by current prescribing practices of PCA in post-surgical patients and sickle cell pain crisis patients at CHOI. A retrospective chart review of the electronic medical record was performed for patients aged 6-17 years of age who had received PCA with morphine, fentanyl, or hydromorphone at CHOI between June 30th, 2015 and June 30th, 2016. Patients unable to report pain scores or on PCA for indications other than post-surgical and sickle cell crises were excluded. Pregnant women were excluded. The primary endpoint is to compare the time to pain goal for the post-surgical and sickle-cell populations, to assess the current status of PCA prescribing and management. Secondary endpoints include the number of naloxone administrations, time to first PCA adjustment, average duration of PCA, and whether the prescribing of continuous infusion of opioid in addition to bolus dosing correlated with improved time to pain goal. Data will be analyzed via descriptive statistics to assess whether there are differences in the safety and efficacy of PCA prescribing practices between the two pediatric populations and to determine if current prescribing practices are adequately controlling pain while maintaining patient safety. Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the current recommendations for PCA prescribing in the pediatric population.

Recognize the challenges associated with pain control in patients with sickle cell pain crisis.

Self Assessment Questions:

Which of the following factors can complicate pain control in pediatric patients with sickle cell pain crisis?

- A: Ability to communicate their pain effectively
- B: Reliable pain score reporting
- C: Perceived "drug seeking" behavior
- D: Previous successful opioid regimens

What serious long term effect can be seen in children with uncontrolled pain?

- A: Increased appetite
- B: Acute sleep disruption
- C: Worsened fear/anxiety
- D: Developmental delay

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-536L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

SMALL TOWN ESA: HOW TO CREATE AND EXECUTE A PHARMACIST-LED PROTOCOL FOR REMOTE MANAGEMENT OF ANEMIA IN SOLID ORGAN TRANSPLANT RECIPIENTS

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Background: Anemia due to chronic kidney disease has a significant negative effect on quality of life and often affects solid organ transplant recipients. To avoid sensitizing blood transfusions, erythropoietin stimulating agents (ESAs) are often used to treat anemia in transplant recipients. ESAs are high cost specialty medications that require frequent monitoring due to serious side effects. At the UW Health Transplant Clinic, transplant pharmacists have been successfully managing anemia independently since 2010. However, many UW transplant recipients with anemia have been excluded from pharmacist management due to geographic limitation and the inconvenience of traveling for frequent ESA injections. The purpose of this project is to increase patient access to pharmacist monitoring of ESA therapy via self-administration and remote monitoring. The secondary outcome is generation of revenue through utilization of in-house specialty pharmacy services. Methods: A chart review of transplant recipients with active orders for ESAs between 11/02/2015 and 11/23/2016 was performed to identify candidates for anemia clinic. The current delegation protocol was updated to include remote management. Patients were evaluated in clinic to determine eligibility for self-administration and remote management. Qualifying patients were enrolled in telephone follow-up and tracked using electronic medical record functionality. Specialty pharmacy revenue was determined using monthly margin and persistence rate. Results/Conclusions: A total of 109 patients were identified on chart review. Additional results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify patients who qualify for treatment of anemia with Erythropoietin-stimulating agents (ESAs).

Describe the impact of remote management of anemia on patient satisfaction and revenue capture

Self Assessment Questions:

Solid organ transplant recipients with the following hemoglobin may qualify for treatment with erythropoietin-stimulating agents:

- A: 9.8 g/dL
- B: 10.5 g/dL
- C: 8.7 g/dL
- D: 11.2 g/dL

What are the potential benefits of remote management of anemia?

- A: Allows for close follow up and management by specialized provide
- B: Potential to increase revenue from in-house specialty services
- C: Increases patient satisfaction
- D: All of the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-585L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

HEALTH CARE PROVIDER PERSPECTIVES ON COMMUNITY PHARMACISTS ROLE IN HEPATITIS C VIRUS (HCV) TESTING AND TREATMENT

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An estimated 3.5 million people in the United States are infected with HCV; however, half of these individuals are unaware of their infection. IDSA guidelines recommend high risk individuals be tested for HCV. High risk individuals include those born between 1945-1965, IV drug users, and those on long term dialysis. Access to testing was recently approved for use in non-traditional health care settings; however, no well established service has been implemented in community pharmacies. The primary objective of this study is to determine health care providers awareness of and perspectives on community pharmacists role in HCV testing and treatment. Secondary objectives include assessing perspectives based on age, sex, practice setting, provider type, and amount of prior pharmacist collaboration. A prospective, multi-site survey based study is currently being conducted. Surveys are assessing health care provider perceptions in three separate study locations. Study locations include both university hospital and general medicine practice facilities. Inclusion criteria are medical doctors, residents, physician assistants, and nurse practitioners holding an active license. Exclusion criteria are students, nurses, and anyone under the age of 18 or not actively practicing medicine. An anonymous survey consisting of 17 multiple choice and Likert scale format questions is being distributed to eligible study participants by the primary investigator and coinvestigators. An additional area for hand written comments is also provided. Surveys are 10-15 minutes in duration and will be collected by the primary investigator upon completion and stored in a locked box. Data collection is being held between the months of January and February 2017. Completion of the survey by study participants designates consent and no personal identifiers are being collected. Data analysis will be completed using SPSS software with descriptive statistics. Research is in progress and results will be available in March 2017 and presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify high risk groups that are recommended to receive Hepatitis C testing per IDSA guidelines.

Discuss reasons for the high rate of undiagnosed individuals with Hepatitis C.

Self Assessment Questions:

Which of the following patients are not considered at high risk for Hepatitis C?

- A: An 18 year old female that used an IV drug one time 6 months prior
- B: A 60 year old male with no other risk factors
- C: A 30 year old female receiving a blood transfusion 5 years prior
- D: A 45 year old male on long term hemodialysis

Which of the following does not contribute to the high rate of undiagnosed individuals with Hepatitis C?

- A: Under reporting of risk factors by patients and providers
- B: Unwilling community pharmacists refusing to perform Hepatitis C testing
- C: Targeting populations other than the baby boomers previously
- D: Testing only in traditional health care setting until recent years

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-845L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EFFECTIVENESS OF A PHARMACIST POPULATION HEALTH INTERVENTION FOR NEWER MEDICATIONS IN CARDIOLOGY

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Purpose Health systems struggle to integrate new medications into clinical practice despite updated guideline recommendations. Amongst providers at the Michigan Medicine, there is a discrepancy between new drug approval and uptake resulting in a reduced number of patients receiving life-saving medications. Notably, previous literature demonstrates higher prescribing rates by providers after contact with a pharmaceutical representative or after obtaining drug information from an external source. This study aims to evaluate the effectiveness of an Electronic Medical Record, pharmacist-based, population health intervention on physician prescribing patterns for newer cardiology medications in outpatient cardiology clinics within Michigan Medicine.

Methods This is a prospective, cluster-randomized controlled study. Patients seen by providers in outpatient cardiology clinics within Michigan Medicine between 2/1/2017 and 10/31/2017 will be included. Randomization will occur at the cardiologist level. Patients will be screened to determine eligibility for one or more of the four study drugs by implementing filters within the EMR. In the intervention cohort, notifications will be sent by pharmacists to providers of eligible patients one day prior to a clinic visit. The primary endpoint for this study is the proportion of patients prescribed ivabradine, sacubitril/valsartan, evolocumab, or alirocumab, within three months of the pharmacist intervention. A logistic regression will be performed to determine whether there is an association between the intervention and new drug uptake. A p-value ≤ 0.05 will be considered statistically significant. Descriptive statistics will be performed and presented as mean \pm standard deviation for continuous and frequency data, with percent representing categorical data. A chi-square test will be used for evaluation of categorical data and a 2-sided student's t-test will be used to analyze outcomes between groups with and without the use of the intervention. Results: N/A Conclusions: N/A

Learning Objectives:

Describe population health management and the general outcomes of interest.

Identify appropriate candidates for ivabradine, sacubitril/valsartan, evolocumab, and alirocumab.

Self Assessment Questions:

Which of the following are the three main population health outcomes of interest?

- A: Morbidity, mortality, reduce or control per capita cost of care
- B: Morbidity, mortality, reduce hospitalizations
- C: Morbidity, mortality, reduce adverse effects
- D: Morbidity, mortality, reduce length of stay

Atrial fibrillation would make a patient with heart failure with reduced ejection fraction ineligible to receive which of the following medications?

- A: Sacubitril/valsartan
- B: Ivabradine
- C: Evolocumab
- D: Alirocumab

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-686L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

MEASURING CLINICAL AND ECONOMIC OUTCOMES IN A COMMUNITY PHARMACY HYPERTENSION MANAGEMENT PROGRAM

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Purpose: The objective of the study is to demonstrate the benefit of a community pharmacist-led hypertension management program and to evaluate sustainability in a large chain drug store. **Methods:** A prospective cohort study, approved by the institutional review board, will be conducted at Walgreens pharmacy in Louisville, Kentucky. Patients participating in the hypertensive management program will receive blood pressure education, an automatic blood pressure monitor, and counseling regarding medication therapy management. Patients will be included if they are greater than 18 years of age, provide informed consent, self-report a diagnosis of hypertension, and are not currently meeting their goal blood pressure. The primary outcome is change in blood pressure, pre- and post-management, with patients serving as their own control group. Secondary outcomes include improvement in medication adherence, proportion of patients achieving blood pressure goal, and proportion of patients receiving miscellaneous services such as immunizations. In order to assess sustainability of the program, economic outcomes will include outputs, the expense of blood pressure machines, and pharmacist time vs. inputs profit from medications, medication therapy management, and vaccines. The study will be powered to detect a 13 mmHg difference in systolic blood pressure, based on prior trials describing the impact of independent community pharmacists on blood pressure. Utilizing 80% power and a 95% confidence interval, a sample size of 35 was calculated; with an estimated 20% dropout rate, a minimum of 42 participants need to be enrolled. **Results:** Approximately 10 patients have been enrolled to date. The enrollment period is still open. Final results are pending; however, preliminary results will be presented at Great Lakes Pharmacy Residency Conference. **Conclusion:** Pharmacist-driven hypertension programs have been successful in various settings; however, data supporting pharmacist-driven hypertension programs in the retail community pharmacy are lacking. This particular hypertension program aims to potentially bridge the gap in literature.

Learning Objectives:

Describe the benefit of a community pharmacist-led hypertension program

Recall hypertension goals per JNC-8 guidelines

Self Assessment Questions:

Which of the following is a benefit of a community pharmacist-led hypertension program?

- A Improved patient adherence
- B Lack of patient education
- C Reduction in clinical services
- D Increased complications of hypertension

Which is the correct blood pressure goal for a 38 year-old male with hypertension and no other past medical history per JNC-8 guidelines?

- A 120/80
- B 150/90
- C 130/80
- D 140/90

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-492L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF A PHARMACIST-DRIVEN FLUOROQUINOLONE STEWARDSHIP PROGRAM

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Fluoroquinolones are commonly prescribed antibiotics in the United States, with attractive attributes, such as convenient oral dosing and broad spectrum coverage for various indications. However, these medications are associated with serious adverse effects, including tendonitis, muscle weakness, cardiotoxicities, and peripheral neuropathies. Fluoroquinolones have also been associated with increased risk of developing methicillin-resistant *Staphylococcus aureus* and *Clostridium difficile* infections (CDI). Previous studies have shown antimicrobial stewardship (AMS) programs are successful in decreasing the incidence of CDI. The goal of this project is to decrease unnecessary prescribing of fluoroquinolones using an AMS pharmacist-driven fluoroquinolone stewardship intervention. The primary outcome of this pre- and post-interventional study is the rate of fluoroquinolones administered before and during the intervention period. Secondary outcomes include incidence of fluoroquinolone-associated side effects, incidence of CDI, acceptance rate of interventions, and appropriateness of fluoroquinolone prescription based upon indication. During the intervention period (November 1, 2016-February 28, 2017), the AMS pharmacist will review profiles of patients who are admitted to any hospital within the Froedtert & the Medical College of Wisconsin health-system and prescribed a fluoroquinolone. The AMS pharmacist will make a recommendation to switch to a different agent, based upon indication and patient-specific characteristics, if applicable. Patients admitted to the oncology floors, on a fluoroquinolone prior to admission, or prescribed a fluoroquinolone for prophylaxis will be excluded from the intervention. Patients meeting criteria between November 1, 2015 and February 28, 2016 will serve as the comparator group. Results and conclusion will be presented at the conference.

Learning Objectives:

Identify indications for which the FDA warns against the treatment with fluoroquinolones

Recall dangerous consequences that can result from treatment with fluoroquinolones

Self Assessment Questions:

Which of the following indications is included in the FDA's warning against treatment with fluoroquinolones?

- A Community-acquired pneumonia
- B Mild to moderate intra-abdominal infection
- C Uncomplicated urinary tract infection
- D Simple skin and soft tissue infection

Treatment with fluoroquinolones is associated with the increase in risk of which major consequence?

- A *Clostridium difficile* infection
- B Thrombocytopenia
- C Osteonecrosis
- D Respiratory arrest

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-414L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION AND ASSESSMENT OF A PHARMACOLOGICAL VENOUS THROMBOSIS PROPHYLAXIS PROTOCOL IN OBESE PATIENTS

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Purpose: Obesity and venous thromboembolism (VTE) are on the rise in the United States, with over one-third of the population classified as obese and approximately 900,000 VTE events each year. It has been shown that obesity is a major risk factor for VTE and currently VTE chemical prophylaxis at Wheaton Franciscan hospitals is not standardized in obese patients. The purpose of this study is to design and implement a VTE pharmacist driven dosing protocol for obese patients with a BMI ≥ 40 . Secondary analysis will look at adherence to the protocol and comparison between dosing before and after protocol implementation. **Methods:** This study was submitted to the Institutional Review Board for approval. The proposed protocol was presented to the P&T committee before education and implementation. Patients included in the pharmacist driven VTE dosing protocol will be: adults >18 years old, BMI ≥ 40 , and requiring chemical thromboprophylaxis. Exclusion criteria will be: CrCl <30 mL/min, platelet count $<100,000$ /mL, post-surgical and pregnant or post-partum patients. Appropriate dosing post protocol will be defined as enoxaparin 40mg subcutaneous twice daily in patients with a BMI ≥ 40 . Retrospective data will be collected from September 1st - November 30th, 2016 to analyze dosing patterns prior to implementation. Education was provided to pharmacists, nurses, and physicians about the changes to dosing and ordering in the protocol. After implementation, adherence data will be assessed from February 1st - March 31st, 2017. **Results:** In the retrospective data, 150 patients with BMI ≥ 40 were analyzed for use of enoxaparin for VTE prophylaxis. 35 patients were found that had received enoxaparin for prophylaxis, with 34 of those patients having received 40mg subcutaneous once daily and one patient who received 30mg subcutaneous twice daily. Prospective data and conclusions will be presented at the Great Lakes Pharmacy Conference.

Learning Objectives:

Describe the risk associated with obesity and thromboembolism in hospitalized patients

Recognize the potential changes that obesity can cause on pharmacokinetic parameters of medications

Self Assessment Questions:

Which of the following is not a risk factor for venous thromboembolism (VTE)?

- A Venous stasis
- B: Hypercoagulable states
- C: Major Surgery
- D: All of the above are risk factors for VTE

What is the approximate risk percentage of developing a VTE for a general medicine patient?

- A 10-20%
- B 25-40%
- C 50-70%
- D 70-80%

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-757L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

RETROSPECTIVE EVALUATION OF INPATIENT HOSPITAL ACQUIRED PNEUMONIA (HAP) AND HEALTHCARE ASSOCIATED PNEUMONIA (HCAP): AN EFFORT TO MINIMIZE CARBAPENEM USE

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Purpose: The 2004 Infectious Disease Society of America (IDSA) guidelines for hospital acquired pneumonia (HAP), ventilator associated pneumonia (VAP), and healthcare-associated pneumonia (HCAP) state carbapenems are an acceptable first line treatment option. Though, the more recent 2016 IDSA guidelines for HAP and VAP no longer include HCAP, they do recommend a seven day treatment course for most HAP patients and they suggest that antibiotic therapy be de-escalated rather than fixed. Furthermore, research has shown that carbapenem overuse can lead to carbapenem resistant Enterobacteriaceae (CRE), development of Clostridium difficile infections, and other secondary infections. The primary objective of this study is to evaluate the duration of therapy and time to de-escalation of carbapenem therapy. The secondary objective of this study is to assess the incidence of opportunistic pathogens, specifically, Clostridium difficile and Stenotrophomonas. **Methods:** This retrospective review was approved by the St. Elizabeth Institutional Review Board. Electronic medical records were used to identify patients greater than 18 years of age who were admitted to a St. Elizabeth Hospital in Edgewood, Florence, or Ft. Thomas Kentucky between January 1st 2016 and June 30th 2016, met the criteria for HCAP or HAP, and received meropenem therapy for greater than 48 hours. Patients were excluded if they had: a history of co-infection with ESBL-producing bacteria, an infectious disease consult, a chronic tracheostomy, or known colonization in the respiratory tract. Data collection included: baseline demographics, allergies, previous diagnosis of chronic obstructive pulmonary disease or interstitial lung disease, previous IV antibiotic use in the last 90 days, white blood cell count, temperature at admission, initial procalcitonin and lactic acid levels, level of care, total duration of meropenem therapy concomitant antibiotic therapy, and culture reports. **Results/Conclusion:** Results and conclusion will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review the current recommendations for treatment of healthcare-associated pneumonia and hospital acquired pneumonia.

Identify potential consequences of overusing meropenem for the treatment of healthcare-associated pneumonia and hospital acquired pneumonia.

Self Assessment Questions:

Based off of the new 2016 guidelines for HAP and VAP, what is the number one risk factor for development of multi-drug resistant pathogens?

- A Previous hospital stay in the past 90 days
- B: Resides in a long-term care facility
- C: IV antibiotic use in the past 90 days
- D: Wound care in the past 30 days

Which of the following statements is true

- A De-escalation based on cultures is not recommended by the 2016
- B The 2016 guidelines for HAP and VAP state the recommended du
- C Overuse of carbapenems is not a risk factor for developing a Sten
- D Overuse of carbapenems can lead to an increased incidence of CI

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-540L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF THE FREQUENCY OF ELECTRONICALLY DISCONTINUED MEDICATIONS AND ASSOCIATED OUTCOMES

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Purpose: With the implementation of electronic prescribing systems, prescription orders can be discontinued electronically and might not be appropriately relayed to the pharmacy. One study showed a 1.5% frequency of dispensing of electronically discontinued medications for five categories of oral medications that were deemed to be high risk when used inappropriately. Our study seeks to evaluate the frequency of dispensing of these five categories of oral and injectable medications within our outpatient pharmacies after the prescription has been electronically discontinued. This data will then be used to determine if there is a relationship with readmission rates. **Methods:** Prescription data from three outpatient pharmacies will be analyzed to identify all new electronic prescriptions for antihypertensives, antiplatelets, oral and injectable anticoagulants, oral and injectable antidiabetics, and statins that were filled for patients age 18 and older. Prescription data evaluated will include medication, dose, directions, date written, date dispensed, and date and time picked up. This data will then be compared to the electronic medical record to determine if the prescription was electronically discontinued before it was dispensed to the patient. Medical record data will include date and time of discontinuation, and reason for discontinuation, if documented. For all the prescriptions where the prescription was dispensed after being discontinued, a chart review will be performed to determine if there is a relationship between the cancelled dispensed medication and 30-day all cause readmission. **Results:** Data collection and analysis is ongoing. Final results and conclusions will be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Explain the potential for error in discontinuing medications electronically
Review current literature in regards to electronically discontinued medications.

Self Assessment Questions:

Based on the findings of the Harvard Vanguard study, how many prescriptions were dispensed in error after discontinuation?

- A 671 (0.7%)
- B: 1,218 (1.5%)
- C: 3,104 (3.7%)
- D: 4,363 (5.2%)

What is a potential issue with the electronic prescribing system?

- A Reduced healthcare costs
- B Improved efficiency
- C Discontinuation notices are not automatically relayed to the pharm
- D Medications can automatically be checked for interactions

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-908L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
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BONE OR BUST? EVALUATION OF BISPHOSPHONATE PRESCRIBING PRACTICES OF PATIENTS ON CHRONIC PREDNISONE THERAPY

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Purpose: Despite strong evidence supporting the use of bisphosphonates in eligible patients receiving chronic prednisone therapy, studies have shown that nearly half of patients fail to be screened and treated for glucocorticoid-induced osteoporosis. The purpose of this study is to determine whether Monroe Clinic properly prescribes bisphosphonates for eligible patients on chronic prednisone therapy according to the 2010 recommendations from the American College of Rheumatology. **Methods:** We reviewed the electronic medical record of patients prescribed prednisone 5mg or greater for 90 or more days in the year 2015 at Monroe Clinic. Patients were excluded if they were less than 18 years of age, their creatinine clearance was less than 30 ml/min, or had a documented allergy or intolerance to a medication in the bisphosphonate class. **Data collection included:** history of a most recent bone mineral density scan, history of fragility fracture(s), and bisphosphonates prescribed in 2015. **The primary outcome of this study is to determine the percentage of patients correctly prescribed bisphosphonate therapy. The secondary outcome is to determine the percentage of eligible patients that should be prescribed a bisphosphonate. Lastly, the tertiary outcome is to determine the percentage of patients requiring additional screening prior to bisphosphonate consideration. Best practice alerts will be developed to identify patients eligible for bisphosphonate therapy. Summary of Preliminary Results:** In progress. **Conclusions reached:** Conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify patients eligible for bisphosphonate therapy.
List counseling points regarding bisphosphonate therapy.

Self Assessment Questions:

Which patient is eligible to receive bisphosphonate therapy? All patients are on chronic prednisone therapy.

- A AB a 60 year old male on prednisone 2mg daily that has a low risk
- B: DE a postmenopausal female on prednisone 5mg daily that has a
- C: GH a 40 year old male on prednisone 10mg daily that has a low risk
- D: JK a premenopausal female on prednisone 10mg daily that has a

What is the most important counseling point to provide a patient on bisphosphonate therapy?

- A Avoid potassium supplements
- B Do not lie down ½ hour after administration
- C Take only with acidic beverage such as orange juice
- D Take with meals to avoid gastric irritation

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-306L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF TRANSITIONING INPATIENT CHEMOTHERAPY REGIMENS TO THE OUTPATIENT SETTING

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Background: Cost containment of high cost therapies is critical to health systems in the current value based reimbursement landscape. Chemotherapy regimens utilizing extended infusions over multiple days have historically required inpatient hospitalization. With the advancement of monitoring strategies and infusion devices transitioning these types of regimens to the outpatient setting is seemingly achievable and potentially cost effective. **Purpose:** This evaluation plans to assess cost-savings to the institution by transitioning two multiday infusion chemotherapy regimens to the outpatient setting. Secondary outcomes will evaluate the impact of this transition on overall patient length of stay, safety, and overall chemotherapy schedule adherence. **Methods:** This single-center retrospective evaluation compared lymphoma patients receiving either R-EPOCH or R-ICE chemotherapy before and after implementation of outpatient infusion therapy from November 2014 through November 2016. The control group defined as patients treated prior to November 2015. These patients will be matched with those patients transitioned to outpatient therapy using a post-hoc multivariate logistic regression to prevent eliminating the majority of patients. Cost of therapy was compared between inpatient and outpatient regimens. Descriptive and demographic categorical data was compared using the Fishers Exact Test. Continuous data was evaluated using the students t-test. A significance level of $\alpha < 0.05$ was used for all analysis. **Results:** Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss agents that comprise R-ICE and R-EPOCH therapy
Identify adverse events possible with R-EPOCH therapy

Self Assessment Questions:

Identify adverse events possible with R-EPOCH therapy

- A Extravasation
- B: Red secretions
- C: Mucositis
- D: All of the above

What toxicity is the agent mesna trying to prevent? More than one answer possible.

- A Peripheral Neuropathies
- B Extravasation
- C Hemorrhagic Cystitis
- D Hand-Foot Syndrome

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-635L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF A PHARMACIST-DRIVEN INTERVENTION TO IMPROVE VACCINATION RATES IN LUNG TRANSPLANT CANDIDATES

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In 2015, transplant pharmacists at the University of Chicago Medicine identified an opportunity to improve vaccination rates for transplant candidates. A pharmacist-led program was launched on 10/01/15 whereby the transplant pharmacist assesses patient records and outlines a vaccination plan for each patient as part of the pre-listing transplant pharmacy evaluation. This study evaluates the impact of this pharmacist-driven intervention on vaccination rates in our heart, liver, and lung transplant patients. Electronic medical records were retrospectively reviewed for waitlist dates, transplant dates, relevant serologic testing, and vaccines given for eight target vaccines: 13-valent pneumococcal conjugate; 23-valent pneumococcal polysaccharide; influenza; hepatitis A; hepatitis B; tetanus, diphtheria, and pertussis; varicella zoster; and herpes zoster. For each of the three organ groups, we present data for three cohorts: 1) pre-intervention including patients transplanted 1/01/14 - 6/30/15 [N=52 for heart, N=32 for liver, and N=37 for lung], 2) post-intervention/transplanted including patients transplanted 10/01/15 - 12/01/16 [N=24 for heart, N=29 for liver, and N=20 for lung], and 3) post-intervention/waitlist including patients on the waitlist as of 12/1/16 [N=24 for heart, N=25 for liver, and N=8 for lung]. Each vaccine for each patient was categorized as not indicated, completed, in progress (e.g., for vaccines administered in sequence), or overdue for administration. Results from this study show notable increases in vaccination rates for 2 of 8 vaccines in our heart transplant patients, 4 of 8 in our liver transplant patients, and 6 of 8 vaccines for our lung patients. This data demonstrates that a pharmacist-led assessment of vaccination can significantly improve vaccination rates among transplant candidates. We suggest that vaccine assessment become a routine part of a transplant pharmacists pre-listing evaluation.

Learning Objectives:

List the vaccinations recommended for administration prior to solid organ transplantation.

Identify patients for whom vaccination is indicated through assessment of serologic testing.

Self Assessment Questions:

Which of the following serologic patterns would require vaccination against hepatitis A virus?

- A HAV total Ab (+), IgG (+), IgM(-)
- B: HAV total Ab (+)
- C: HAV total Ab (+), IgG (-), IgM (+)
- D: HAV total Ab (+), IgG (+), IgM (+)

Which of the following vaccine schedules is correct?

- A 23-valent pneumococcal conjugate followed two months later by 1
- B Live vaccines should be administered four weeks after transplant
- C Attenuated influenza vaccines should be avoided in transplant can
- D If Tdap vaccination status is unknown, providers should preferenti

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-424L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

TIME TO DE-ESCALATION OF ANTIBIOTICS FOLLOWING PHARMACIST NOTIFICATION OF POSITIVE BLOOD CULTURE RESULTS IN A COMMUNITY HOSPITAL

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Background: In addition to the patient's clinical response, blood cultures are utilized to direct appropriate therapy including de-escalation of antibiotics. De-escalation is defined as the discontinuation or change to a reduced spectrum antibiotic¹. There are many advantages to de-escalating antibiotic therapy such as reducing antibiotic toxicity, decreasing the development of resistance, and minimizing the emergence of antibiotic exposure-related infections¹.

Mercy Health Muskegon has a well-established process of notification when a direct blood smear produces a positive result. However, there is no current notification process for preliminary or final blood culture results. In addition, rapid PCR testing, a real-time DNA amplification process used for detecting genes associated with antibiotic resistance², was recently implemented on gram positive cocci blood cultures and also does not have a standard notification process. Timely notification of these results provide an opportunity for pharmacists, who are already actively involved in antibiotic dosing, to impact de-escalation.

Purpose: To develop a standard notification process for rapid PCR and positive blood culture results. Time to de-escalation was measured before and after the implementation of standard notification process.

Methods: Lab will notify pharmacy of rapid PCR and blood culture results as they become available. Upon notification, the pharmacist will be responsible for reviewing the microbiology reports and current antibiotic regimen. The pharmacist will then notify the physician of any de-escalation opportunities. Patients will be included in the evaluation of time to de-escalation if they are adult inpatients with rapid PCR and/or positive blood culture results and documented antibiotic administration. Patients will be excluded if their blood cultures did not direct the course of antibiotic treatment or their antibiotic regimen was not de-escalated after finalization of blood culture results.

Results: Pending

Conclusion: Pending

Learning Objectives:

Identify the role pharmacists play in antimicrobial stewardship

Recognize the importance of de-escalating empiric antibiotics as soon as it is possible to do so safely

Self Assessment Questions:

1. A patient was started on empiric therapy of vancomycin and cefepime. Which of the following scenarios is NOT considered antibiotic de-escalation:

- A: Switching vancomycin to cefazolin for MSSA bacteremia
- B: Discontinuing cefepime for MRSA bacteremia
- C: Adding levofloxacin for pan-sensitive pseudomonas bacteremia
- D: Discontinuing vancomycin for gram negative bacilli bacteremia

Which of the following are potential benefits of antibiotic de-escalation?

- A: Reduce antibiotic toxicity
- B: Decrease the development of antimicrobial resistance
- C: Decrease the emergence of antibiotic exposure-related infections
- D: All of the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

HEPARIN IN ACUTE CORONARY SYNDROME

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Purpose: Unfractionated heparin (UFH) is frequently used in the management of acute coronary syndrome (ACS). UFH dosing is standardized using a weight-based protocol with bolus and maintenance recommendations. Current guidelines recommend using an initial loading dose of 60 units/kg with a maximum of 4000 units and an initial infusion of 12 units/kg/hour, not to exceed 1000 units/hour. Data are lacking to evaluate the appropriateness of weight-based caps in obese patients with ACS. The goal range of the monitoring parameter aPTT is 53-68 seconds. The purpose of this study is to determine if weight-based doses of UFH for ACS without a dosing cap result in similar rates of therapeutic aPTT achievement for obese and non-obese individuals.

Methods: This is a retrospective chart review of adult patient (>18 years of age) who were admitted to IUH Methodist, Saxony, and West Hospitals from October 2012-October 2016 and who received UFH for the treatment of ACS. ACS is identified by patients diagnosed with a STEMI, NSTEMI, or unstable angina. IRB approval was granted with a waiver of informed consent. The aPTT values for obese patients, classified by BMI ≥ 30 , were compared to those of non-obese patients. The primary endpoint is to identify the percentage of aPTTs within goal range in the first 24 hours. Secondary endpoints included percentage of initial aPTTs and aPTTs at 48 hours that are within goal range and number of major bleeding events. Major bleeding defined by overt bleeding with a decrease in hemoglobin of ≥ 2 g/dL, requiring a transfusion of blood, requiring discontinuation of heparin infusion, or resulting in death. Results: Data collection and analysis is ongoing and will be presented in full at GLPRC. Conclusion: Data collection and analysis is ongoing and will be presented in full at GLPRC.

Learning Objectives:

Describe current guideline recommendations for dosing of UFH in ACS and possible limitations in obese patients.

Review current data surrounding dosing of UFH in obesity.

Self Assessment Questions:

Which of the following is the recommended UFH dose for treatment of a patient with ACS by AHA/ACC?

- A: Heparin 5,000 units SQ Q8h
- B: Heparin 60 unit/kg bolus and 12 unit/hr infusion
- C: Heparin 80 unit/kg bolus and 18 unit/hr infusion
- D: Heparin 5,000 units IVP Q12h

Based on previously published data, what is the most appropriate body weight to use for dosing heparin in obese patients?

- A: Actual body weight
- B: Ideal body weight
- C: Adjusted body weight
- D: Lean body weight

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-588L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ESTABLISHMENT OF AN AMBULATORY CLINICAL FORMULARY SYSTEM

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Background: Implementation of a medication formulary system in both the inpatient and outpatient settings has been shown to streamline the medication procurement process, improve appropriateness of therapy, and control medication costs. Currently, the ambulatory clinics in the Duchossois Center for Advanced Medicine (DCAM) at the University of Chicago Medicine (UCM) have no formulary system. As a result, there is little restriction on medications that may be obtained by providers and administered in the clinics. **Objectives:** The primary objectives of this study are to quantify new formulary and nonformulary requests before and after implementation of a formulary system in the DCAM ambulatory clinics. **Methods:** This is a prospective, single-center, quality improvement study. Clinic medication procurement history will be reviewed prior to implementation. Each clinic (n=32) will gain a customized medication formulary based on commonly procured and administered medications between January 1, 2016 and October 1, 2016. After implementation, new formulary requests must be submitted to the Pharmacy and Therapeutics committee for review, while nonformulary requests must be reviewed by a clinical pharmacy manager. All new formulary and nonformulary requests will be quantified prior to implementation from December 2015 to January 2017 and from time of implementation until March 14, 2017 by reviewing Pharmacy and Therapeutics committee meeting minutes. Process control charts will be utilized to determine the impact of established formulary system.

Results/Conclusion: Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the difference between a new formulary request and a nonformulary request at the University of Chicago Medicine
Discuss the benefits of an ambulatory clinic formulary system

Self Assessment Questions:

At the University of Chicago Medicine, a new formulary request is made when _____ and a nonformulary request is made when _____.

- A: A clinic wants to permanently add a medication to formulary; a me
- B: A medication is needed for one-time use in the clinic; a clinic want
- C: A clinic wants to create a new formulary; a clinic would like to desi
- D: A clinic would like to designate an item as nonformulary; a clinic w

Implementation of an ambulatory clinical formulary system has been shown to:

- A: Streamline the medication procurement process
- B: Improve appropriateness of therapy
- C: Control medication costs
- D: All of the above

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-907L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF CLINICAL AND ECONOMICAL OUTCOMES IN OUTPATIENTS WHO RECEIVED DALBAVANCIN

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Purpose: Acute bacterial skin and skin structure infections (ABSSI) have become the leading cause of hospital and ambulatory care visits. Patients are most commonly hospitalized for Staphylococcus aureus ABSSI, which has increased by 123% from 2001 to 2009. There has also been a 44% increase in the cost of Staphylococcus aureus ABSSI hospitalizations from 2001. Patients diagnosed with an ABSSI often require outpatient antimicrobial therapy via a peripherally inserted central catheter (PICC), adding to the cost and burden on a patient. As such, in December 2014 our site decided to add dalbavancin to be used in the outpatient setting over other conventional therapies for patients diagnosed with ABSSI, such as vancomycin or cefazolin. Dalbavancin has been found to be non-inferior to these antibiotics and has the benefit of once weekly infusion with no need for a PICC line on discharge. The objective of this study is to evaluate the clinical and economical outcomes of dalbavancin use in the outpatient setting over conventional IV antibiotic therapies. **Methods:** A single-center, retrospective study will be conducted to evaluate patients diagnosed with cellulitis that required outpatient IV antibiotics through the physician treatment center (PTC) from January 2015 through December 2016. Eligible patients include those ≥18 years of age, discharged on cefazolin or dalbavancin to the PTC based on the infectious disease physicians discretion. Patient factors will be assessed to determine why they were given one antibiotic versus the other. Clinical outcomes of dalbavancin use will be defined by resolution of infection at thirty days and reoccurrence. The cost effectiveness of dalbavancin versus cefazolin will also be assessed by comparing the total cost of the PTC visit for each patient. Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify what pathogens dalbavancin has activity against.
Describe when dalbavancin would be indicated over another antibiotic.

Self Assessment Questions:

Dalbavancin has shown to be active in vitro and in clinical situations against which of the following pathogens?

- A: Staphylococcus aureus-Methicillin Resistant S. aureus (MRSA)
- B: Enterococcus faecalis – Vancomycin resistant strains (VRE)
- C: Pseudomonas aeruginosa
- D: Enterobacter spp.

RJ is a 35 yo male. He is 5'10" and weighs 95 kg. He has a history of IV drug abuse, and does not have health insurance. The patient was diagnosed with MSSA cellulitis to his right hand which was caus

- A: Stay on cefazolin and go on home health
- B: Stay on cefazolin and go to the outpatient infusion center
- C: Stop cefazolin and get dalbavancin at the outpatient infusion center
- D: Stay on cefazolin and get dalbavancin in the outpatient infusion center

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-362L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

COMPARISON OF MORPHINE AND HYDROMORPHONE CONTAINING PATIENT CONTROLLED EPIDURAL ANALGESIA (PCEA) SOLUTIONS IN PEDIATRIC POST-OPERATIVE PATIENTS

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Purpose: The goal of this study is to examine what parameters of hydromorphone and morphine containing PCEAs have the greatest impact in controlling pain in pediatric patients after scheduled surgeries. Published studies have reported that patient controlled epidural analgesia with an opioid/ropivacaine containing solution after surgery in the pediatric population can be both safe and effective for pain management. Hydromorphone and morphine are two commonly used opioids for epidural analgesia. Minimal data are available on the impact of opioid selection, weight-based dosing parameters of the basal and bolus doses, and concentration of ropivacaine in PCEAs with respect to pain scores in pediatric patients. **Methods:** A retrospective chart review was completed to identify patients within the electronic health record who, over an 18 month period, had epidural analgesia post-operatively with either hydromorphone or morphine. Patients between the ages of 5 and 17 years who used a PCEA for at least 48 hours post-op had their charts reviewed. Data collected included pain scores on post-op days 0-2, type of opioid used in the epidural solution, dosing parameters, changes made to the epidural solution, number of PCEA button demands and deliveries, need for naloxone initiation for pruritus, concomitant use of scheduled acetaminophen, and length of hospital stay. This study has been approved by the Institutional Review Board as an expedited review. **Results/Conclusions:** A total of 46 patients met inclusion criteria over the defined study period (21 hydromorphone and 25 morphine containing PCEAs were utilized). The most common procedure performed was the Nuss procedure (46% of patients). The most common reason for exclusion was a transition from epidural pain management to IV PCA pain management <48 hours after surgery due to lack of pain control or issues with the epidural site (14 patients). Further statistical analysis is underway and will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain what procedures a post-operative epidural block may be most effective for.

Review safe weight based doses for pediatric epidural analgesia.

Self Assessment Questions:

Which one of the following procedures would a patient controlled epidural be most appropriate for?

- A: 8 year old patient with a history of hypoplastic left heart syndrome
- B: 15 year old patient with a history of Pectus Excavatum undergoing
- C: 12 year old patient in the emergency room with her first broken arm
- D: 2 year old patient with right lower lobe pneumonia undergoing a

Which one of the following doses would be appropriate for a PCEA in a pediatric patient?

- A: Morphine 0.1 mg/kg/hr
- B: Ropivacaine 0.2 mg/kg/hr
- C: Hydromorphone 30 mcg/kg/hr
- D: Morphine 0.01 mcg/kg/hr

Q1 Answer: B Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-352L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EFFECT OF DESMOPRESSIN ON HEMATOMA EXPANSION IN PATIENTS ON ANTIPLATELET AGENTS WITH SPONTANEOUS INTRACEREBRAL HEMORRHAGE

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Purpose: Antiplatelet therapy at the time of spontaneous intracerebral hemorrhage (sICH) has been associated with an increased risk of hematoma expansion and mortality. Current guidelines recommend consideration of a single dose of desmopressin in sICH associated with antiplatelet agents despite limited supporting literature. This study aims to evaluate the efficacy of desmopressin in patients with sICH on antiplatelet therapy at the time of diagnosis. **Methods:** This is a retrospective chart review of adult patients admitted to Spectrum Health Butterworth Hospital with ICD-9 and ICD-10 codes for intracerebral hemorrhage. Propensity score matching was utilized to allow for a comparison of patients on an antiplatelet agent who received desmopressin to similar patients who did not receive desmopressin. Patients were excluded if they presented with traumatic brain injury, had an active coagulopathy, or had thrombocytopenia on admission. Data were collected to characterize patient demographics, discharge disposition, hemodynamic status, functional outcomes, concomitant medications and blood product utilization. The primary outcome is the incidence of hematoma expansion. Secondary outcomes include in-hospital mortality and change in Modified Rankin Scale from baseline. **Results:** Final results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the factors that increase the risk of mortality in spontaneous intracranial hemorrhage.

Explain the mechanism of desmopressin in antiplatelet reversal.

Self Assessment Questions:

Which of the following would pose a high risk of mortality in sICH?

- A: Small initial hemorrhage volume
- B: Hemorrhage with no ventricular involvement
- C: Hematoma growth over the first 6 hours
- D: Glasgow Coma Scale of 15

What is the proposed mechanism of antiplatelet reversal with desmopressin?

- A: Increased adenosine diphosphate (ADP)
- B: Increased von Willebrand factor
- C: Increased fibrinogen
- D: Increased calcium

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-570L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

CLINICAL OUTCOMES RELATED TO PLATELET INHIBITION IN PATIENTS REQUIRING CORONARY ARTERY BYPASS GRAFTING

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Purpose: Patients who undergo coronary artery bypass grafting (CABG) that are on a P2Y12 inhibitor prior to surgery are at increased risk for postoperative bleeding, and have an increased need for blood product transfusions. The current guidelines recommend discontinuing P2Y12 inhibitors between 3 to 7 days prior to surgery depending on the agent, however as many as 30% of patients are nonresponders to the medications, therefore may not require a preoperative waiting period. At St. Joseph Mercy Oakland (SJMO), P2Y12 reaction unit (PRU) levels are drawn prior to CABG surgery, even though the Guidelines do not specify a level that is considered safe for surgery. The purpose of this study is to assess the relationship between preoperative PRU levels and postoperative bleeding outcomes in patients with coronary artery disease (CAD) previously treated with clopidogrel, prasugrel, ticagrelor, or ticlopidine who are undergoing CABG. **Methods:** This is a retrospective, single center, cohort study conducted at SJMO. Patients were identified using ICD codes for CABG surgery that occurred between October 2015 and October 2016, and were on a P2Y12 ADP inhibitor prior to surgery. Exclusion criteria included age \leq 18 years old, pregnancy, and emergent surgeries (defined as within 24 hours of admission). Patients with normal platelet function were in the control group and those with inhibited platelet function were in the experimental group. Primary endpoints include preoperative PRU levels, and postoperative blood transfusions. Secondary endpoints include ICU length of stay (LOS), and hospital LOS. There will be a subgroup analysis looking at which P2Y12 inhibitors were used preoperatively, and the number of days the P2Y12 inhibitors were held. **Results:** Data collection currently in process. **Conclusion:** Results to be presented at Great Lakes Pharmacy Residency Conference 2017.

Learning Objectives:

Review the current Guidelines for patients undergoing CABG surgery and appropriate discontinuation of P2Y12 inhibitors.

Discuss the test used to assess P2Y12 platelet function and interpretation of that test.

Self Assessment Questions:

Which antiplatelet agent is recommended to be held for at least 5 days prior to surgery according to the ACCF/AHA Guidelines for Coronary Artery Bypass Graft Surgery?

- A Prasugrel
- B Aspirin
- C Clopidogrel
- D Ticlopidine

What test can be used to determine platelet function of a patient on a P2Y12 inhibitor?

- A Ptt
- B Pru
- C Hgb
- D Inr

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-375L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DEVELOPING AND IMPLEMENTING A STANDARD PROCESS FOR TRANSITIONING PATIENTS FROM DOACS TO WARFARIN

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Background: Since 2010, direct oral anticoagulants (DOACs) have been available as an option for patients requiring anticoagulation for deep venous thrombosis, pulmonary embolism, or atrial fibrillation. DOACs include apixaban, dabigatran, edoxaban, and rivaroxaban. Unlike warfarin, DOACs do not require coagulation lab monitoring or dietary restrictions. Occasionally, patients need to transition from a DOAC to warfarin. This can be challenging and time-consuming due to lack of evidence-based recommendations and limited published research. **Purpose:** The purpose of this study is to develop and implement a standard process for the management of patients transitioning from DOACs to warfarin at Mercy Health Muskegon pharmacist-managed anticoagulation clinics. **Methods:** After development of a standard process, data will be collected from patients transitioned from DOACs to warfarin. The primary endpoint is time spent by pharmacy staff developing a patient's transition plan. This endpoint will be compared against estimates from pharmacy staff of how long this process took before implementation of the standard process. Secondary endpoints will include pharmacist adherence to the standard process, patient adverse events during the transition period (start of transition to first therapeutic INR), and time to first therapeutic INR. Data will be gathered and entered into patient's electronic charts by pharmacists and pharmacy technicians at the anticoagulation clinics. **Results and Conclusions:** The study is currently ongoing. The results and conclusions will be presented at the 2017 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the role of an anticoagulation clinic pharmacist for transitioning a patient from a DOAC to warfarin.

List potential reasons for needing to transition a patient from a DOAC to warfarin.

Self Assessment Questions:

Which of the following best describes the role of a pharmacist in transitioning a patient from a DOAC to warfarin?

- A Provide recommendation to physician
- B Create transition plan for patient
- C Counsel patient on appropriate use of anticoagulation medications
- D All of the above

Which of the following is a potential reason for transitioning a patient from a DOAC to warfarin

- A Cost to patient
- B Decline in renal function
- C Bleeding event while using DOAC
- D All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-976L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

USE OF LACE SCORE AS PREDICTOR OF CLINICAL OUTCOMES IN PALLIATIVE CARE PATIENTS

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Purpose: The LACE score is a tool used to predict unplanned hospital readmission or death within 30 days of hospital discharge. The tool has been validated in medical and surgical patients; however, palliative care patients likely have a higher baseline LACE scores due to comorbid conditions, which may limit the predictive value of the score. The objective of this study is to evaluate the utility of the LACE score in the palliative care population to drive resource utilization to highest risk patients. **Methods:** The study will be a single-center retrospective cohort design. Palliative care patients will be identified by their consultation to the inpatient palliative care team and assessed to determine their LACE score. Data collected will include, but is not limited to: Length of stay, acuity of admission, Charlson comorbidity index, emergency department use, medications at discharge, insurance coverage/utilization. The primary outcome assessed is unplanned hospital readmission or death within 30 days of discharge. The outcome will be evaluated against the predictive value of the LACE score using logistic regression analysis. Other criteria will be assessed alongside the LACE score to determine whether other clinical characteristics correlate more closely with outcomes. **Results/conclusion:** To be presented at Great Lakes Pharmacy Residency Conference

Learning Objectives:

Describe how the LACE score is used to predict clinical outcomes
Identify populations where the LACE score has been validated

Self Assessment Questions:

Which of the following outcomes is the LACE score intended to predict?

- A: 30 day mortality
- B: 30 day readmissions
- C: 30 day readmission AND mortality
- D: Cost to the health system

In which of the following populations has the LACE score been validated and associated with predictive value?

- A: Heart failure population
- B: Medical/surgical patients with relatively low Charlson comorbidity index
- C: Elderly patients (>80 years old)
- D: Palliative care patients

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-892L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION AND ASSESSMENT OF A BENZODIAZEPINE DOSE ESCALATION INTERVENTION FOR ALCOHOL WITHDRAWAL IN AN ACADEMIC MEDICAL CENTER EMERGENCY DEPARTMENT

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Purpose: Use of benzodiazepines and standardized protocols for alcohol withdrawal management has shown a reduction in life-threatening complications of withdrawal, such as seizures and delirium tremens. Additionally, dose escalation of benzodiazepines or front loading decreases the need for mechanical ventilation and may decrease intensive care unit (ICU) length of stay. The primary objective of this study is to increase the proportion of patients that receive loading doses of benzodiazepines for alcohol withdrawal in the emergency department (ED) by implementing an order panel to standardize benzodiazepine dose escalation. **Methods:** A retrospective observational study design was approved by the institution pharmacy review committee, and designated a quality initiative project exempt from institutional review board approval. A multi-disciplinary team approach was used to develop an alcohol withdrawal order panel utilizing benzodiazepine dose escalation. The primary outcome and impact of the intervention will be measured by number of benzodiazepine doses that meet criteria for a loading dose, defined as 2 mg or greater lorazepam or 10 mg or greater diazepam. Patients will be identified for post intervention data collection if they are eighteen years or older with suspected alcohol withdrawal, and have an admission or discharge diagnosis code documented as alcohol withdrawal, alcoholism, or alcohol-related problem in the electronic health record. Patients who were not prescribed a benzodiazepine or who received an oral benzodiazepine in the ED will be excluded. Data will be collected for a six-month period following implementation to achieve a sample size of 50 patients post implementation. Pre-intervention data is historical and was previously collected. Data collection for secondary outcomes will include ED intubation rates, ICU admissions, length of ICU and hospital stay, ventilator days, and seizure activity in the ED. **Results and conclusions:** Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review the rationale for early management of alcohol withdrawal and effects of kindling

Translate current literature to the application of an emergency department benzodiazepine dose escalation intervention

Self Assessment Questions:

What is an example of a severe complication of alcohol withdrawal?

- A: Gastrointestinal upset
- B: Insomnia
- C: Headache
- D: Delirium tremens

Recent literature utilizing front-loading or benzodiazepine dose escalation strategies have shown a reduction in:

- A: Use of dexmedetomidine
- B: Use of clonidine
- C: Patient satisfaction
- D: Need for intubation

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-390L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DEVELOPMENT AND VALIDATION OF AN AUTOMATED REPORT DASHBOARD FOR DISPENSING RECONCILIATION OF CONTROLLED SUBSTANCES FROM A NON-PROFILING PYXIS

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Purpose: Recent high-profile media events highlighting results of DEA visits across the country have prompted several health-systems to re-assess their controlled substance management practices. The Controlled Substance Act requires closed-loop documentation of controlled substances from receipt to the end user. The current method for many hospitals is a manual process for dispensing reconciliation from automated dispensing cabinets (ADC); this process is both time intensive and removed from the transaction process. The largest barrier for the automation for dispensing reconciliation continues to be the lack of interoperability between ADC reporting systems and electronic medical record (EMR) systems. This project is aimed to: 1) identify functional limitations and barriers for the development of a computerized dispensing reconciliation report 2) development and validation of a computerized dispensing reconciliation report at OhioHealth Riverside Methodist Hospital in support of system initiatives to maintain more accurate and complete closed loop documentation of controlled substance use. **Methods:** This is an IRB exempt study. A computerized dispensing reconciliation report will be developed to include transaction values based on current standards of practice for manual dispensing reconciliation. A closed-loop dispense is defined as complete accountability for a specified dispense with a net 0 value (mL, mg, etc.) after all linked transactions have been analyzed. Manual validation of a dispensing reconciliation report will analyze: time saved with computerized reconciliation, percent of total transactions reviewed, percent capture rate of transactions and number of closed loop dispenses identified. **Results:** Data collection and analysis is currently in progress. A total 594 transactions were captured over two weeks for completion of validation analysis. **Conclusion:** Manual dispensing reconciliation processes challenge pharmacy departments to balance best-practice dispensing reconciliation recommendations and limited staff dedicated to controlled substance management. If able to overcome interoperability limitations, a computerized report improves accuracy and completeness of reconciliation for controlled substances dispensed.

Learning Objectives:

Identify current barriers for hospitals to document comprehensive dispensing reconciliation from automated dispensing cabinets.
Discuss approaches to improve reconciliation of anesthesia controlled substance use in a large community teaching hospital.

Self Assessment Questions:

The biggest barrier to computerized dispensing reconciliation is:

- A: There is no need for implementation of computerized dispensing
- B: Time to implement a computerized report
- C: Interoperability between automated dispensing cabinets and the e
- D: No dedicated staff to controlled substance management

Which of the following should be included in a closed-loop dispense:

- A: Refill, Outdate, Dispense, Return, Waste
- B: Dispense, Administration, Waste, Return
- C: Verification, Preparation, Delivered, Administered
- D: Dispense, Administration

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-788L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF PHARMACISTS ROLE IN CARE TRANSITIONS AND REDUCTION OF HOSPITAL READMISSIONS.

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Purpose: Transitions of care (TOC) pharmacists reconcile medication regimens to ensure medication accuracy and patient safety upon discharge. Investment in TOC pharmacists has proven to have a positive financial impact to health systems. This study aims to compare the addition of two TOC pharmacists to a discharge technician role at a safety net hospital. The primary objective of this research project is to compare TOC services impact on the 30-day readmission rate versus technician-based bedside discharge medication services alone. Currently, the hospital-wide 30-day readmission rate is 22%. Secondary objectives will assess type of TOC interventions documented and ability of the TOC pharmacist to reach the patient once discharged for follow-up at 3 and 14 days. **Methods:** This retrospective chart review will examine the impact of TOC pharmacists on 30-day readmission rates, compared to only having technician-based discharge medication services available. Admitted patients who are counseled by the TOC pharmacist will be included in the study. Each portion of the study will examine services for a 3 month period. The hospital electronic medical record (EMR) will be used to collect data. Patients will be identified for the research project through logged clinical interventions. Data collection will include the following: type of TOC pharmacist interventions, the rate of readmission 30 days post-discharge, and ability of a TOC pharmacist to reach the patient post-discharge at 3 and 14 days. **Results:** Preliminary results show with only technician-based bedside discharge medication services available, the 30-day readmission rate was 17%, compared to a hospital rate of 22%. However, over the 3 month period examined, only 30% of prescriptions obtained were for chronic conditions. Final results and the conclusion will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the clinical and financial impacts of a transitions of care service
Recognize disease states penalized by CMS for 30-day readmission.

Self Assessment Questions:

Which disease state is penalized by CMS for 30-day readmission?

- A: Diabetes
- B: Heart failure
- C: Asthma
- D: Hypertension

Starting in FY17, which disease state was added to the penalized list by CMS?

- A: Acute Myocardial Infarction (AMI)
- B: Chronic Obstructive Pulmonary Disease (COPD)
- C: Total Knee Arthroplasty (TKA)
- D: Coronary Artery Bypass Graft (CABG)

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-721L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

CORRELATION BETWEEN INPATIENT PAIN CONTROL AND OUTPATIENT OPIOID PRESCRIPTION FILLING

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Purpose: The objective of this study is to determine if there is a correlation between pain control in the inpatient setting and subsequent opioid prescriptions being filled as an outpatient. The Centers for Disease Control (CDC) guideline on opioid prescribing for chronic pain states that no more than a seven day supply is typically needed for acute pain due to the increased risk of addiction with longer duration of therapy. However, there is no data correlating opioid prescribing and pain management during an inpatient admission to opioid prescribing after discharge. Beginning in the September of 2016, the HSHS St. Elizabeths Hospital Pharmacy Department implemented an institution specific policy allowing for editing of pain therapy PRN qualifiers to reflect the potency of prescribed pain medication and appropriate coverage of all pain levels. As a result, the nursing administration adherence to providing the pain medication correlating to the patients reported pain level increased by approximately 10%. Evaluation of the increased compliance with inpatient pain therapy policy to effects on prescribing opioids after discharge is the next phase of the project.

Methods: After receiving IRB approval, a retrospective chart review of the electronic medical record system from September through December 2016 included pharmacy adjustments to the opioid entry, opioid doses administered during the hospitalization, corresponding reported pain levels, pain medications prescriptions and day supply upon discharge. This information will be compared with subsequent pain medication refill history to determine if a correlation exists between inpatient pain management and outpatient opioid prescribing.

Learning Objectives:

Recall the Center for Disease Controls current recommendations on opioid prescribing at discharge.

Describe the importance of limiting prescribing of opioids to patients in acute pain.

Self Assessment Questions:

LL is a 35 yo WM presenting to the hospital with complaints of abdominal pain. He is taken for an urgent cholecystectomy and is now being discharged home the next day. Which of the following is the best

- A: Give LL a 7 day supply of hydrocodone/acetaminophen 10-325mg
- B: Educate LL on over-the-counter pain relief, such as acetaminophen
- C: Refer LL to a pain specialist
- D: Give LL a 14 day supply of hydrocodone/acetaminophen 5-325mg

Which of the following is true regarding opioid prescribing?

- A: All patients in acute pain should be prescribed opioids
- B: There is no risk of addiction with prescribing a 3-day supply of opioid
- C: Opioids should only be prescribed for patients with chronic pain
- D: Opioids may be prescribed for patients in acute pain uncontrolled

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-641L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF PHARMACY-DRIVEN BUNDLED DISCHARGE INTERVENTIONS ON HOSPITAL UTILIZATION POST-DISCHARGE AT THE JESSE BROWN VA MEDICAL CENTER

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PURPOSE: Discharge planning at the Jesse Brown Veterans Affairs Medical Center (JBVAMC) involves the multidisciplinary coordination of care performed by social workers, physicians, pharmacists, nurses, dietitians, and additional specialties, culminating in JBVAMCs version of bundled discharge interventions. The role of pharmacists in JBVAMCs discharge planning has evolved and enhanced over time beyond a thorough medication reconciliation process. In recent years, pharmacy has been performing more clinical and comprehensive interventions while coordinating JBVAMCs multidisciplinary bundled discharge service. The purpose of this study is to assess the impact of JBVAMCs pharmacy-driven bundled discharge interventions on the composite endpoint of all-cause hospital utilization rates within 10 and 30 days post discharge. **METHODS:** This study is a retrospective, electronic chart review of patients discharged from the JBVAMC pre- and post-implementation of pharmacy-driven bundled discharge interventions. Veterans discharged between September 1, 2004 through August 31, 2005 for the pre-implementation group and from September 1, 2015 through August 31, 2016 for the post-implementation group will be evaluated for study inclusion. The primary endpoint is a composite outcome of all-cause hospital utilization, defined as any documented, unplanned hospital visit including readmission, emergency department, urgent care, primary care, and acute care visits, within 10 and 30 days post-discharge. Secondary endpoints include a cost-savings analysis for hospital utilization, the difference in 30-day hospital utilization due to medication-related events, and the difference in number of patient-initiated phone calls 30 days post-discharge. Various subgroup analyses will also be assessed for the post-implementation group including 30-day hospital utilization rates based on type of provider performing discharge medication counseling, percent of patients discharged on medications with specialized discharge intervention, and percent of patients who left the hospital without their discharge medications.

RESULTS/CONCLUSION: Data collection and analysis is ongoing. Results and conclusion will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the Institute for Healthcare Improvements suggested 3-step strategy for completing medication reconciliation.

Describe the responsibilities of pharmacists involved in JBVAMCs bundled discharge interventions.

Self Assessment Questions:

According to the Institute for Healthcare Improvement, what are the 3 sequential steps in completing medication reconciliation?

- A: Clarify, evaluate, reconcile
- B: Verify, clarify, reconcile
- C: Reconcile, evaluate, verify
- D: Assess, verify, reconcile

Which of the following describes the role of pharmacists in JBVAMCs bundled discharge service?

- A: Reconcile medications and provide clinical recommendations across
- B: Assure sufficient refills of critical medications, update expired med
- C: Perform bedside medication delivery with counseling, an updated
- D: All of the above

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-725L04-P

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(if ACPE number listed above)

INITIAL ROMIPLOSTIM DOSING AND TIME TO PLATELET RESPONSE IN PATIENTS WITH TREATMENT REFRACTORY IMMUNE THROMBOCYTOPENIA

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Purpose: Limited data are available investigating higher initial romiplostim doses for treatment-refractory immune thrombocytopenia (ITP), which may be used to shorten the onset to platelet response and facilitate hospital discharge. The primary objective of this study was to compare the time to a platelet count (PLT) $10 \times 10^9/L$ between patients who received an initial romiplostim dose of 2 mcg/kg/week versus 1 mcg/kg/week. Secondary objectives included time to PLT $\geq 30 \times 10^9/L$ and $\geq 50 \times 10^9/L$, percentage of patients achieving platelet responses, hospital length of stay (LOS), and incidence of adverse events. **Methods:** This was a retrospective, single-center, cohort study including hospitalized adults with corticosteroid- and IVIG-refractory ITP. A baseline PLT $< 10 \times 10^9/L$ was required. Patients were stratified by their initial romiplostim dose into cohort 1 (1 mcg/kg/week) and cohort 2 (2 mcg/kg/week). Descriptive statistics were applied to analyze data collected from electronic medical records. **Results:** A total of 18 patients were included, 4 in cohort 1 and 14 in cohort 2. Patients in cohort 2 had a median initial dose of 4.5 mcg/kg/week. Patients in cohort 2 achieved a PLT $\geq 10 \times 10^9/L$ in a median of 2 days versus 4.5 days for cohort 1. More patients in cohort 2 achieved a PLT $\geq 30 \times 10^9/L$ (42.9% vs. 25%) and PLT $\geq 50 \times 10^9/L$ (28.6% vs. 25%). The median hospital LOS was shorter in cohort 2 (13.5 vs. 20 days). Clinically relevant non-major bleeding was noted more frequently in cohort 1 (75% vs. 28.6%). No thrombotic or bone marrow reticulin formation events occurred. **Conclusion:** Our study suggests that higher initial romiplostim doses are safe for hospitalized patients with treatment-refractory ITP. Compared to FDA-approved dosing, higher initial doses may shorten time to platelet responses and hospital LOS. Further large-scale studies are needed to confirm these findings.

Learning Objectives:

Identify the initial romiplostim dosage per labeling approved by the Food and Drug Administration

Discuss outcomes related to platelet response and hospital length of stay among patients receiving an initial romiplostim dose 2 mcg/kg/week versus 1 mcg/kg/week

Self Assessment Questions:

Which of the following is the recommended initial romiplostim dosage per FDA-approved labeling?

- A: 1 mcg/kg/week
- B: 1 mcg/kg/day
- C: 1 mg/kg/week
- D: 1 mg/kg/day

Which of the following is true regarding outcomes among patients who received an initial romiplostim dose of 1 mcg/kg/week compared to a dose 2 mcg/kg/week?

- A: Patients receiving an initial romiplostim dose of 1 mcg/kg/week needed more hospitalizations
- B: Patients receiving an initial romiplostim dose 2 mcg/kg/week took longer to achieve platelet response
- C: Patients receiving an initial romiplostim dose 2 mcg/kg/week had higher rates of bleeding
- D: There were no differences between the cohorts in the rates of adverse events

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-697L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ASSESSMENT OF THE ORDERING PROCESS FOR ANTIPSYCHOTIC LONG-ACTING INJECTIONS BETWEEN CARE TRANSITIONS

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Purpose: Long-acting injectable (LAI) antipsychotics have become a useful tool for pharmacists in treating patients with psychiatric disorders. Currently, however, there is no process in place at the Richard L. Roudebush VA Medical Center that ensures a patient's LAI antipsychotic medication will be on their inpatient med profile when they are transferred from outpatient to inpatient status. This may result in duplication of therapy, errors of omission, unanticipated drug interactions, and potential harm to veterans. The overall aim of this project is to identify gaps in existing processes for LAI antipsychotics and implement changes to current processes in order to eliminate lack of awareness regarding these medications. **Methods:** This project is quality improvement based and will be completed by using the yellow belt A3 format. Once the A3 for this process improvement is completed, specific barriers to smooth transition from outpatient to inpatient care will be addressed. This will be done through the use of rapid experiments and voice of the customer surveys. The results of the performed rapid experiments and voice of the customer surveys will be used to improve current standards of practice within the Richard L. Roudebush VA Medical Center.

Learning Objectives:

Describe how the A3 process improvement methodology can be used to improve existing pharmacy processes in regards to long-acting injectable antipsychotics

Recognize the unique issues that may arise from poor documentation of long-acting injectable antipsychotics

Self Assessment Questions:

What is the ideal state for the ordering of long-acting injectable antipsychotics?

- A: Providers recognize "hold" status for LAI antipsychotics as active inpatient
- B: LAI antipsychotics are pulled into the EMR as an active inpatient medication
- C: Patient care teams have a dedicated member that determines if a medication is needed
- D: Duplication of therapy is eliminated for LAI antipsychotics

What was the largest issue in regards to the ordering of long-acting injectable antipsychotics?

- A: LAI antipsychotics placed on "hold" status
- B: LAI antipsychotics documented via clinic note
- C: LAI antipsychotics documentation lacked a uniform process
- D: LAI antipsychotics administered at outpatient clinics

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-929L05-P

Activity Type: Knowledge-based Contact Hours: 0.5
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EVALUATION OF THE USE OF PROPROTEIN CONVERTASE SUBTILISIN/KEXIN TYPE 9 (PCSK9) INHIBITORS IN STATIN INTOLERANT PATIENTS OF AN OUTPATIENT LIPID CLINIC

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Background/Purpose: PCSK9 inhibitors have been shown to effectively lower LDL-C and other atherogenic lipid markers both in patients on statins and in those unable to tolerate statins. Studies have also shown tolerability of these agents in statin intolerant patients in a controlled, randomized fashion that included placebo-controlled crossover phases to verify intolerance. However, external validity of these findings is unclear in a clinic setting in which providers must assess and treat both real and perceived statin intolerance. Additionally, current studies do not directly compare the two agents, nor do many reports describe the obtainability of these costly medications. The primary objective of this study, therefore, is to describe and compare the tolerability of PCSK9 inhibitors in statin intolerant patients. Secondary objectives are to describe and compare the efficacy, the incidence and type of adverse reactions, and the obtainability of these agents in statin intolerant patients. **Methods:** This retrospective chart review will include adult outpatients aged 18 to 89 seen by a clinical pharmacist at the Ohio State University Wexner Medical Center Lipid Clinic who were prescribed a PCSK9 inhibitor and who have intolerance to one or more statins (defined by lab changes or reported side effects). The PCSK9 inhibitor will be defined as tolerable if a patient successfully obtained and initiated it and did not discontinue drug due to an adverse event by specified time points. The medication will be defined as effective if a patient successfully obtained and initiated it and reached patient-specific LDL-C and non-HDL-C goals per the National Lipid Association (NLA) guidelines or reached an LDL reduction of >50% from baseline per the NLA familial hypercholesterolemia (FH) guidelines for those patients with suspected or confirmed FH. Outcomes will be described overall and compared between the two PCSK9 inhibitors. **Results and Conclusions** to come.

Learning Objectives:

Explain PCSK9 inhibitor mechanism of action and approved indications
Describe the utility of PCSK9 inhibitors in statin intolerance

Self Assessment Questions:

PCSK9 inhibitors work by which mechanism?

- A Reduce degradation of LDLR, increasing LDLR available to clear LDL
- B Reduce the absorption of dietary cholesterol, decreasing LDL-C
- C Decrease cholesterol biosynthesis in the liver
- D Block the NPC1L1 protein on the small intestine, decreasing cholesterol

Which of the following statements is correct?

- A PCSK9 inhibitors cannot be used in statin intolerant patients due to intolerance
- B PCSK9 inhibitors should only be used in those with laboratory-proven statin intolerance
- C PCSK9 inhibitors have proven mortality benefits over statins in statin intolerant patients
- D PCSK9 inhibitors are well tolerated in statin intolerant patients

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-668L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

MAKING THE BEST CHOICE: NOREPINEPHRINE VS PHENYLEPHRINE FOR INTRAOPERATIVE USE

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Purpose: Since 2002, researchers have been evaluating intraoperative hemodynamics and their effects on postoperative complications. These works suggest the importance of maintaining intraoperative blood pressures near normal physiologic parameters; however, an established definition of intraoperative hypo- and hyper-tension is still lacking. The objective of this retrospective study is to examine the intraoperative use of NE vs. PE, and to identify patients hemodynamic response to each vasopressor. Specifically, we will determine if, based on perioperative variables, one vasopressor provides better hemodynamic control. **Methods:** The study will be a retrospective cohort review of patients that underwent operations performed by orthopedics, transplant general, vascular, colo-rectal, or gastro-intestinal surgical specialty. Patients will be divided into three groups: those who received NE, PE, or both. The primary endpoint of this study is to assess the percentage of intraoperative time a patient's MAP is below 60 mm Hg and the hemodynamic response (magnitude and duration) achieved with the use of norepinephrine as a vasopressor agent as compared to phenylephrine. The secondary endpoints are examine the triggers in a patient's hemodynamics that facilitate the use of either vasopressor and determine the amount of NE used vs PE to maintain desired hemodynamics, MAP \geq 60 mmHg. Statistical analysis will be done using logistic regression to assess patient demographics, MAP variations, and clinical outcomes associated with intraoperative PE vs NE use. Excel code will be used to collect area under the curve (AUC) for each patient's intraoperative hemodynamics (mmHg x time). **Conclusion:** Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Define the blood pressure parameters used as a marker to determine when intraoperative hypotension necessitates drug therapy.
Identify the post-operative complications related to severe intraoperative blood pressure variability from patient's baseline.

Self Assessment Questions:

Intraoperative hypotension is defined as:

- A Sbp < 100
- B MAP < 60 mmHg
- C A two standard deviation from mean BP relative to each patient's baseline
- D There is no established value parameter

Intraoperative blood pressure variability has been linked to

- A Acute kidney injury
- B Cardiac complications
- C Myocardial injury
- D All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-660L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION OF STANDARDIZED PROCESS FOR STERILE COMPOUND PREPARATION AND DISPENSING OF PERIOPERATIVE RETROBULBAR BLOCKS AT A COMMUNITY

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Purpose: Medications are routinely used during eye surgeries to provide anesthesia, treatment, and promote wound healing. When an ophthalmic product cannot be obtained from a licensed manufacturer, these medications are often compounded by the pharmacy department. With the growing incidence of common eye diseases requiring surgical intervention and the emergent need for perioperative ophthalmic products, it is essential that institutions have procedures in place to support the medication ordering and administration process. Electronic health records (EHR) and computerized physician order entry (CPOE) systems allow institutions to streamline the medication use process. In efforts to prevent medication errors and minimize delays in patient care, this four-hospital community health system developed a comprehensive process to optimize the existing workflow for ordering and preparing retrobulbar blocks used in eye surgeries and through utilization of the institutions CPOE system in the medication use process. **Methods:** A taskforce consisting of inpatient pharmacists and pharmacy technicians was assembled to analyze the current workflow and identify areas of improvement. A revised workflow and EHR tools will be developed to incorporate retrobulbar blocks in order sets for specific ophthalmic procedures and streamline the physician order entry process. This will help minimize duplications in workflow and enhance safety by allowing barcode scanning to be used during the preparation, dispensing, verification, and administration steps of the process. An electronic survey will be distributed to the pharmacy and ophthalmology departments to evaluate employee satisfaction with the new workflow in comparison to the previous workflow. This project is a quality improvement project and is therefore exempt from review by the Institutional Review Board. **Results and conclusion:** Final results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify limitations in the workflow for ordering and preparing ophthalmic products.

Discuss potential benefits of incorporating computerized physician order entry (CPOE) systems in the medication use process.

Self Assessment Questions:

Which step has been identified as an area of improvement in the ophthalmic blocks workflow?

- A: Ophthalmology department staff places handwritten orders
- B: Pharmacy receives, prepares, and dispenses the medication using
- C: The product is automatically charged to the patient upon dispensing
- D: The nurse scans the barcode and administers the medication

Which of the following is an advantage of using CPOE modules within the EHR?

- A: Reduce transcribing and miscommunication errors
- B: Increase in preparation time
- C: Increase in time for drug verification
- D: Decrease in cost for implementation

Q1 Answer: A Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-746L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF A TEACHING OBJECTIVE STRUCTURED CLINICAL EXAMINATION (TOSCE) ON STUDENT CONFIDENCE IN PATIENT CARE SKILLS LABORATORY

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Purpose: An Objective Clinical Structured Examination (OSCE) is a well-established method used to evaluate learners' competence, interpersonal and critical thinking skills in a variety of simulated clinical scenarios. However, many students experience increased levels of stress and anxiety due to uncertainty of their performance in high-stake summative assessments. A Teaching Objective Clinical Structured Examination (TOSCE) is a formative assessment with the goal of providing students with structured individual feedback following their performance of an activity. Students can utilize feedback to improve on their areas of weakness, which may increase their confidence and performance on high-stake OSCEs and problem-based assessments. The primary objective is to examine the relationship between the use of a TOSCE and its impact on student confidence in core competence areas. **Methods:** All third-year pharmacy students (n=148) participated in a TOSCE as part of their course requirements in their skills-based laboratory. The TOSCE was implemented in a men's and women's health-focused laboratory with the goal of developing students' abilities in providing patient assessments, education, and recommendations on selected nonprescription and prescription products. A 21-item survey was administered at five points during the semester to assess student confidence longitudinally with the baseline survey occurring prior to men's and women's laboratory. The survey included three components assessing students' confidence: clinical skills, communication, and problem resolution. Students responded to each item using a 5-point Likert scale (not at all confident to extremely confident). An additional 7 items (strongly disagree to strongly agree) were added to the baseline survey to measure changes in confidence and attitude before and after completion of their problem-based assessment. **Results:** Results will be presented at the Great Lakes Pharmacy Conference. **Implications/Conclusions:** A TOSCE has the potential to influence student confidence in core competency areas and improve their performance on summative assessment.

Learning Objectives:

Discuss benefits of implementing TOSCE in a patient care skills laboratory

Describe student confidence and readiness in summative laboratory skills assessments after TOSCE implementation

Self Assessment Questions:

Which is a disadvantage of OSCE when compared to traditional examinations?

- A: Less expensive to implement
- B: Fewer personnel resources
- C: Higher level of examinee stress
- D: Lower level of observer fatigue

2. Which of the following can be best assessed through a well-structured OSCE in comparison to traditional multiple choice examinations?

- A: Interpersonal and communication skills
- B: Professional judgement
- C: Problem resolution
- D: All of the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-722L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION OF A MULTI-MODAL ANALGESIA PATHWAY FOR THE TREATMENT OF SICKLE CELL VASO-OCCLUSIVE CRISES IN THE EMERGENCY DEPARTMENT.

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Background: Sickle cell disease is one of the most common genetic diseases in the United States affecting an estimated 100,000 people. A frequent complication observed in this patient population is vaso-occlusive crisis which often result in painful episodes leading to emergency department admissions. Established treatment guidelines have emphasized the use of opioid medications, with limited review of non-opioid or multi-modal analgesic treatment options. Consequently, increasing doses of opioid medications are being prescribed in the emergency department, a trend that is seen at the University of Chicago Medicine. High doses of opioid medications do not necessarily produce better pain control but instead place patients at a higher risk for adverse effects such as respiratory depression and hyperalgesia. **Purpose:** The purpose of this study is to determine the impact of a multimodal analgesic pathway on the treatment of sickle cell vaso-occlusive crisis in the emergency department. **Methods:** This is a retrospective chart review of adult patients in the emergency department who were treated for sickle cell vaso-occlusive crisis pre- and post-implementation of a multi-modal analgesic clinical pathway during the study period June 2016 to January 2017. Descriptive statistics will be utilized with a t-test for quantitative data and chi-squared analysis for qualitative data. **Results:** Preliminary results: A total of 127 patients were included in the pre-implementation group. The mean age of the pre-implementation group was 26 (4.36) years old and males accounted for 59% (n=49). The incidence of multi-modal analgesia was 7.8% (n= 10). The average oral morphine equivalents (OME) received per patient was calculated to be 36.61 mg (43.83) of hydromorphone and 6.75 mg (9.09) of morphine. Final results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Define sickle cell vaso-occlusive crisis.

Identify the proposed benefits of multi-modal analgesia use in the treatment of sickle cell vaso-occlusive crisis.

Self Assessment Questions:

1) Adequate treatment of vaso-occlusive crisis is beneficial in preventing which of the following complications?

- A: Acute chest syndrome
- B: Fever
- C: Pulmonary hypertension
- D: Infection

Which of the following are proposed benefits of multi-modal analgesia use?

- A: Decreased opioid consumption
- B: Decreased opioid related side effects
- C: Decreased patient reported pain scores
- D: All of the above

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-573L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

SENSITIVITY OF THREE SURVEILLANCE METHODS OF DETECTING POTENTIAL CONTROLLED SUBSTANCE DIVERSION IN AN ACADEMIC MEDICAL CENTER

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Purpose: Compare the sensitivity of three methods of detecting potential controlled substance (CS) diversion by employees of an academic medical center. Diversion of CS by healthcare employees in the inpatient setting threatens patient care, employee safety, and employer liability. Between January 2010 and December 2013, diversion resulted in an estimated loss of over 19 million dosage units nationwide. Effective surveillance methods are essential to detection of CS diversion, but adherence to recommendations for CS diversion prevention and detection is variable among organizations throughout the nation. No literature currently exists to quantify the sensitivity of different methods of detecting situations at high risk for CS diversion in the inpatient setting. **Methods:** Reports generated by three different software that identify potential diverters of CS will be analyzed and evaluated to determine which employees are "high risk" for diversion over a consecutive 90-day period. The primary outcome will be the percentage of employees in each report who are considered to be high risk. Secondary outcomes will be percentage of users not identified to be high risk and time and cost of utilizing each method. Demographic data will also be collected and will include employee position, nursing unit, medications involved in diversion activity, and types of transactions that define the employee as high risk. Descriptive statistics will be used to analyze differences between methods. **Preliminary Results:** Demographic data and primary and secondary outcomes data will be presented when data collection and analysis is complete. **Conclusions:** Will be generated based on data analysis.

Learning Objectives:

Reproduce at least one of three reasons why the nursing profession is considered to be at highest risk for internal diversion of controlled substances.

Outline four populations who are at direct risk of harm from controlled substance diversion.

Self Assessment Questions:

Which of the following statement(s) is one reason why the nursing profession is considered to be at highest risk for internal diversion of controlled substances?

- A: Nurses don't receive training in controlled substances
- B: Nurses frequently interact with controlled substances
- C: Controlled substances are only available to nurses
- D: Nurses are the only at-risk piece in the medication use pathway w/

Who is at direct risk of harm from an employee who is diverting controlled substances?

- A: Patients being cared for by a diverter
- B: The diverter
- C: The employer and its employees
- D: A, B, and C

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-928L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

AN EVALUATION OF A TEAM-BASED APPROACH TO CONTROL BLOOD PRESSURE USING HOME-MONITORING TECHNOLOGY IN VETERANS WITH HYPERTENSION

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Purpose: Given the rapidly evolving technology and the emphasis to provide patient-centered care, Captain James A. Lovell Federal Health Care Center (FHCC) utilizes a team-based approach among providers, nurses and pharmacists as an effort to improve blood pressure control using home tele-monitoring technology. As medication experts with prescriptive authority, VA pharmacists involved in the care coordinated home telehealth program enhances patient centered care while increasing access to care and minimizing delays to care. The purpose of this study is to evaluate the clinical changes and summative findings in Veterans enrolled in the Veterans with Hypertension Home Telehealth Program (VHHTP). The primary objective of this study is to describe the process of VHHTP and to assess the clinical impact of having a team-based approach hypertension clinic. **Methods:** This impact evaluation study is a retrospective cohort study evaluating the clinical changes in Veterans participating in VHHTP. Descriptive statistics will be used to evaluate the protocol process using averages and percentages. Clinical changes will be analyzed using paired T-tests to assess for statistical significance, using an alpha level less than 0.05. **Results/Conclusions:** Data collection is pending and results will be presented at the Great Lakes Pharmacy Resident Conference

Learning Objectives:

Discuss the population characteristics and the types and number of clinical pharmacist interventions made in this study

List the challenges involved with managing a collaborative approach telehealth clinic

Self Assessment Questions:

Which of the following was the most common pharmacist intervention made during the course of the study?

- A Medication history discrepancy
- B: Education/counseling
- C: Optimizing pharmacotherapy
- D: Referral to other specialties

The scope of clinical pharmacy specialists involved in Veterans with Hypertension Home Telehealth Program (VHHTP) includes

- A Titrating blood pressure medications
- B Initiating insulin if A1c is elevated
- C Initiating a statin if clinically indicated
- D Monitoring for signs and symptoms of gout

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-377L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

RIVAROXABAN VERSUS ENOXAPARIN FOR THE SECONDARY PROPHYLAXIS OF VENOUS THROMBOEMBOLIC DISORDER IN PATIENTS WITH ACTIVE CANCER

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Purpose: Due to the hypercoagulable nature of malignancy, venous thromboembolic disease (VTE) is a major source of morbidity and mortality. In fact several national guidelines, including the CHEST guidelines and the National Comprehensive Cancer Network, both recommend secondary prophylaxis against VTE. They also recommend enoxaparin as the drug of choice for this indication over warfarin, and claim insufficient data to recommend the direct oral anticoagulant (DOAC) agents. Therefore, it is the aim of this study to compare the efficacy and safety of enoxaparin versus rivaroxaban for the secondary prevention of VTE in patients with active cancer. **Methods:** This research is a multi-center, retrospective, observational cohort study. This study includes patients with active cancer that received care at Kentucky One Health ambulatory oncology clinics between July 6, 2013 and July 6, 2016. The two cohorts consist of patients with active cancer receiving either enoxaparin or rivaroxaban for secondary VTE prophylaxis. The primary endpoint is the incidence of VTE during the observation period, which is defined as six months past the date of anticoagulation initiation. Secondary endpoints include major bleeding and all-cause mortality. Data will be obtained utilizing a pre-printed data collection sheet and electronic medical records. Categorical data will be evaluated utilizing the chi-squared test and Fishers exact test where appropriate. Parametric continuous data will be evaluated utilizing the Students t-test; non-parametric continuous data will be evaluated using the Wilcoxon rank sum test. An a priori alpha of 0.05 will be set for significance. Data analysis will be performed using Microsoft Excel and SAS statistical software. These methods have been determined to meet federal exemption criteria by the Catholic Health Initiatives Institutional Review Board. **Results:** Final results and conclusions are pending and will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review the pharmacologic differences between low molecular weight heparin (LMWH) and rivaroxaban.

Discuss current evidence regarding the use of direct oral anticoagulants for VTE prophylaxis in patients with cancer.

Self Assessment Questions:

Which of the following anticoagulants has the most evidence supporting its use for venous thromboembolic disease (VTE) prophylaxis in patients with cancer?

- A Rivaroxaban
- B: Heparin
- C: Enoxaparin
- D: Warfarin

Which of the following patient characteristics represents a confounding variable to this trial, by also independently increasing the risk of venous thromboembolic disease (VTE)?

- A Additional anticoagulation/antiplatelet agents utilized
- B Malignancy subtypes at particularly high risk of VTE (brain, pancre
- C History of gastrointestinal bleed
- D Low body mass index

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-887L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

INCIDENCE AND CLINICAL OUTCOMES OF UNINTENDED DISCREPANCIES IN WARFARIN DISCHARGE ORDERS

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Purpose: Warfarin dosing is frequently complicated by variable patient response, a narrow therapeutic index, and drug interactions. Community Health Network (CHNw) has a protocol allowing pharmacists to automatically manage adult inpatient orders for warfarin. However, upon patient discharge, the physician is responsible for reconciling the dosing. The goal of this study is to determine if a collaborative drug practice agreement allowing pharmacists to prescribe a warfarin regimen at discharge is necessary. **Methods:** A retrospective chart review was conducted within the CHNw hospitals. Patients were eligible for the study if they had an inpatient order for warfarin and used a CHNw-affiliated anticoagulation clinic for outpatient management between July 1, 2015 and June 30, 2016. The primary endpoint was incidence of warfarin dosing discrepancies at discharge. The secondary endpoints included the number of patients with an international normalized ratio (INR) less than 2 or greater than 5 at their first anticoagulation appointment post-discharge, the number of patients returning to the hospital within 30 days of discharge with a thrombotic or major bleeding event, and the incidence of dosing discrepancies when discharged on a weekday versus a weekend. The clinical secondary outcomes of an out of range INR and readmissions were compared between the patients with and without an unintended discrepancy at discharge. **Preliminary Results:** This study evaluated 220 patients. At discharge, 54.5% of patients had a discrepancy between the warfarin regimen that was prescribed and the regimen that was recommended by the pharmacist. At the first anticoagulation clinic appointment after discharge, 45.5% of patients had an INR less than 2 and 1.8% of patients had an INR greater than 5. **Conclusion:** Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the importance of accurate warfarin dosing during transitions of care

Define the pharmacist's role in warfarin management when a patient is being discharged from the hospital

Self Assessment Questions:

When a pharmacist is responsible for writing a warfarin regimen at discharge, which of the following outcomes may occur?

- A: More re-admissions for a bleeding event
- B: Greater incidence of a therapeutic INR at the first anticoagulation
- C: More re-admissions for a thrombotic event
- D: None of the above

Which of the following could be an acceptable responsibility of a pharmacist to help with the transitions of care for a patient on warfarin?

- A: Coordinate with the anticoagulation clinic to set up an early appointment
- B: Write a prescription for a warfarin regimen at discharge
- C: Counsel the patient on changes made to a warfarin regimen
- D: All of the above

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-452L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

VALIDATION OF A TARGETED ANTIBIOTIC ALGORITHM FOR MULTIPLEX-PCR BLOOD CULTURE IDENTIFICATION (BCID) RESULTS BASED ON SUSPECTED SOURCE OF INFECTION

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Purpose: Rapid diagnostic tests are changing the way that medical providers start and change therapy for patients with a multitude of conditions. Multiplex polymerase chain reactions (PCR) utilized for pathogen identification in blood cultures allow clinicians to tailor antimicrobial therapy in a shorter amount of time compared to traditional cultures and sensitivities, which may provide final results at 48-72 hours from collection. The purpose of this project is to validate an algorithm based on multiplex-PCR blood culture identification results stratified by suspected infectious source.

Methods: This study was a retrospective chart review approved by the Institutional Review Board. Charts were reviewed for patients admitted to 4 critical care units at a tertiary community medical center between June 1, 2016 and August 31, 2016. Patients were included if they were greater than 18 years of age and had a blood culture result with a pathogen identified via multiplex-PCR. Patient charts were reviewed for blood culture collection date and time, multiplex-PCR result date and time, suspected source of infection, empiric antimicrobial selection, proposed algorithm antibiotic, and final sensitivities to each. All data was stored without patient identifiers and maintained confidentially by the primary investigator. Collected data was analyzed to validate and compare actual empiric antimicrobial selection with algorithm guided antibiotic selection in regards to final culture sensitivity. Data was also used to assess over and/or under coverage based on all final culture sensitivities.

Results: Data collection and analysis is currently in progress. Results and conclusions will be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss utility of multiplex-PCR Blood Culture Identification and other blood culture rapid diagnostic tests

Identify specific limitations of multiplex-PCR Blood Culture Identification and other blood culture rapid diagnostic tests

Self Assessment Questions:

Which marker of resistance is NOT identified on this institution's specific multiplex-PCR Blood Culture Identification panel?

- A: MecA (MRSA)
- B: KPC (Carbapenemase producing)
- C: VanA / VanB (Enterococcus)
- D: ESBL producing Enterobacteriaceae species

What is the estimated turnaround time for pathogen identification in blood cultures?

- A: 1-2 hours from blood culture collection
- B: 1-2 hours from blood culture identified as having growth
- C: 12 hours from blood culture identified as having growth
- D: 48 hours from blood culture identified as having growth

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

COMPARISON OF TOLERABILITY FOLLOWING INITIATION OF THREE COMMON NON-OPIOID PHARMACOLOGIC THERAPIES FOR CHRONIC PAIN

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Background: Chronic non-cancer pain is one of the most common and costly medical conditions in the US, particularly within military veteran populations. While the Center for Disease Control recommends the use of non-opioid therapies for chronic pain where possible, adverse effects of each non-opioid therapy must be considered, especially those that lead to therapy discontinuation. The objective of this project is to determine whether duloxetine, gabapentin, and pregabalin vary in tolerability when used for pain in a veteran population, and whether the likelihood of tolerability varies with several patient-specific factors.

Methods: This project was submitted to and exempted by the University of Cincinnati Institutional Review Board and Cincinnati VAMC Research and Development Committee. The Cincinnati VA Medical Centers Computerized Patient Record System has been used to identify patients with new initiations of duloxetine, gabapentin, and pregabalin. Patients with a new initiation of a study medication for a pain-related indication will be retrospectively reviewed. Patients who choose to have the study medications dispensed from non-VA pharmacies will be excluded. Patient-related information collected will include patient date of birth, gender, renal function, hepatic function, relevant comorbidities, and concomitant interacting medications. Additional information related to the study medications will include dates of initiation, subsequent fills, and discontinuation (if applicable), starting and maximum doses prescribed, and reason for discontinuation. The primary outcome for this project will be the percentage of patients who discontinue the study medication due to intolerance within 6 months of initiation. Secondary outcomes include type of adverse effect leading to discontinuation, as well as rates of intolerance in correlation to drug-drug interactions, comorbidities, decreased renal or hepatic function, age, and appropriateness of dosing. Chi-square tests will be used to compare rates of intolerance between groups. **Results:** Pending data collection/analysis **Discussion:** Pending data collection/analysis

Learning Objectives:

Discuss the importance of identifying appropriate non-opioid therapy for patients with chronic non-cancer pain

Review the study design and findings of a PGY1 residency project comparing the tolerability of 3 non-opioid therapies for chronic pain

Self Assessment Questions:

In randomized controlled trials of duloxetine, gabapentin, or pregabalin for pain-related indications, about what percentage of patients discontinued therapy due to adverse effects?

- A 3-5%
- B: 10-20%
- C: 25-30%
- D: 40-50%

Based on a 2012 survey of 8,781 adults, what was the prevalence of "chronic, daily pain"?

- A 5.7%
- B 11.1%
- C 20.3%
- D 35.5%

Q1 Answer: B Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-878L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF PROVIDER EDUCATION ON METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS NASAL SWABS AND ANTIBIOTIC DE-ESCALATION

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Purpose: To evaluate the influence of provider education regarding methicillin-resistant *Staphylococcus aureus* (MRSA) nasal swabs as an antimicrobial stewardship instrument to assist with vancomycin de-escalation in the intensive care unit (ICU) for patients with pneumonia. The primary outcome of the study was to assess the days of empiric vancomycin therapy after ICU providers receive live education regarding the negative predictive value of the MRSA nasal swab. Secondary outcomes included evaluating positive and negative predictive values of MRSA nasal swabs at a regional acute care medical center, development of MRSA pneumonia, provider acceptance of the intervention, and patient mortality. **Methods:** This is a quasi-experimental pilot study to assess the impact of provider education regarding MRSA nasal swab results and subsequent de-escalation of empiric vancomycin. The initial phase of the study of a retrospective electronic medical record review to identify and gather data from ICU patients with pneumonia. This retrospective data provided baseline time to de-escalation of empiric vancomycin. The intervention phase focused on the education of ICU providers. Provider education consisted of live presentations of the literature regarding the predictive value of MRSA nasal swabs concerning MRSA pneumonia. The providers received a post-presentation survey to gauge initial response to the education and assess the probability of implementation into practice. The final stage of the study involved collecting data prospectively, post-provider education to see the impact of education on empiric vancomycin de-escalation.

Results: To be presented at the conference. **Conclusion:** To be presented at the conference.

Learning Objectives:

Describe the literature regarding the predictive value of methicillin-resistant *Staphylococcus aureus* (MRSA) nasal swabs.

Recognize the potential impact of using MRSA nasal swabs as an antimicrobial stewardship tool.

Self Assessment Questions:

The majority of studies evaluating the negative and positive predictive values of MRSA nasal swabs in predicting MRSA pneumonia found which of the following to be true?

- A High negative and high positive predictive value
- B: High negative and low positive predictive value
- C: Low negative and high positive predictive value
- D: Low negative and low positive predictive value

Which of the following consequences is associated with the use of intravenous vancomycin?

- A Acute kidney injury
- B Diarrhea
- C Hypertension
- D *Clostridium difficile*

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-323L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

THE IMPACT OF A NURSING-DRIVEN SEDATION PROTOCOL ON MECHANICALLY VENTILATED PATIENTS IN THE INTENSIVE CARE UNIT

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Purpose: The purpose of this study is to evaluate the impact of a nursing-driven sedation protocol on outcomes of patients receiving mechanical ventilation. A previous institutional drug utilization review of the sedation protocol found that patients who received sedation while mechanically ventilated had inappropriate documentation of both the medications utilized and associated sedation scores. A new nursing-driven sedation protocol was subsequently developed and implemented to improve utilization of sedative agents, documentation, and patient outcomes. Current recommendations from the Society for Critical Care Medicine (SCCM) advocate for the use of analgesia-first sedation in mechanically ventilated Intensive Care Unit (ICU) patients. **Methods:** Patients mechanically ventilated in the ICU were reviewed pre- and post implementation of the protocol to assess several factors related to the patients sedation. Patients older than eighteen years old who received sedation while mechanically ventilated in a critical care area were included. Patients were excluded if they underwent targeted temperature management (TTM), were pregnant, or received mechanical ventilation for less than 24 hours. The primary objectives were length of ICU stay and duration of mechanical ventilation, both reported as average number of days. Secondary measures evaluated include utilization of the sedation medication and sedation vacation order sets, documentation of Richmond Agitation Sedation Scale (RASS) goal and RASS scores, appropriateness of alterations in sedation agents, and documentation of delirium assessments. Appropriateness of sedation agents and dosing alteration were assessed based on a nursing algorithm for sedation, developed as part of the protocol. **Results:** A total of 118 patients from the post-implementation and 133 patients from the pre-implementation phase were analyzed. Length of ICU stay and duration of mechanical ventilation were both decreased in the post-implementation group (7.7 vs 10.6 days and 5.0 vs 6.1 days, respectively). **Conclusions:** Conclusions will be made following complete data analysis.

Learning Objectives:

Review the current SCCM recommendations for the management of sedation and analgesia in mechanically ventilated ICU patients
Identify the benefits of maintaining recommended light levels of sedation in mechanically ventilated ICU patients

Self Assessment Questions:

The 2013 Society for Critical Care Medicine Guidelines for Pain, Agitation, and Delirium recommend which of the following in terms of sedation for mechanically ventilated ICU patients?

- A: Routine use of benzodiazepines for sedation
- B: Analgesia-first sedation be used to achieve appropriate level of sedation
- C: Delay use of analgesia medications until patient is adequately sedated
- D: Avoid analgesia if possible in all patients who are mechanically ventilated

Targeting a light level of sedation for mechanically ventilated patients in the ICU has been shown to provide all of the following benefits except?

- A: Decreased duration of mechanical ventilation
- B: Shortened ICU length of stay
- C: Increased rate of adverse events
- D: Decreased rate of adverse psychological outcomes

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-855L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DELIRIUM IN DOLLARS: EVALUATION OF A PAIN, AGITATION, AND DELIRIUM PROTOCOL

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Purpose: In 2013, the Society of Critical Care Medicine (SCCM) published updated guidelines regarding the management of pain, agitation, and delirium (PAD) in the critically ill population. This update promoted the use of analgesia-first sedation, or adequate treatment of pain with analgesic medications before initiating sedative medications, such as benzodiazepines, propofol, or dexmedetomidine. By treating pain first, it may be possible to limit the use of sedative agents, particularly benzodiazepines, which have been associated with increases in delirium incidence and mortality. To optimize PAD management and minimize benzodiazepine use for sedation, a new pilot PAD sedation protocol was implemented at Henry Ford Hospital (HFH) in 2015. The efficacy, safety, and costs of the PAD protocol as compared with the previously used Continuous Sedation protocol are currently unknown. **Methods:** This project is a retrospective quasi-experimental study conducted in the medical ICU population at HFH. The control population is composed of patients who received the Continuous Sedation protocol for sedation management prior to August 2015, which utilized continuous opioids with continuous benzodiazepines. The intervention population are those patients who received the pilot PAD protocol after December 2015, which maximizes the use of opioids prior to initiating a sedative agent. The primary outcome is change in delirium incidence, assessed with the CAM-ICU tool and chart review for key terms. Secondary outcomes include time spent within goal sedation score range, initiation of new antipsychotic medications used for delirium treatment, incidence of self-extubation, and adverse effects related to medications (hypotension, bradycardia, ileus, hypertriglyceridemia, pancreatitis, and propofol-related infusion syndrome). Costs assessed include those attributable to cumulative doses of the analgesic and sedative medications received as part of each patients protocolized sedation management, ICU and hospital length of stay, and mechanical ventilator days. **Results/Conclusions:** Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the primary changes to clinical practice promoted by the 2013 update to the SCCM Management of Pain, Agitation, and Delirium guidelines

Recognize the importance of ICU delirium and the benefits associated with its prevention

Self Assessment Questions:

Which of the following is true based on the recommendations of the 2013 SCCM Management of Pain, Agitation, and Delirium guidelines?

- A: Use deep sedation to maintain unconsciousness in mechanically ventilated patients
- B: Monitor depth of sedation infrequently to decrease healthcare resource use
- C: The use of nonbenzodiazepine sedatives (propofol or dexmedetomidine)
- D: Choice of pain and sedation assessment methods is not important

Which of the following consequences has not been associated with ICU delirium?

- A: Prolonged ICU length of stay
- B: Increased mortality
- C: Post-ICU cognitive impairment
- D: Decreased duration of mechanical ventilation

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-468L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATING THE IMPACT OF BENZODIAZEPINE QUALITY IMPROVEMENT INITIATIVES AT EDWARD HINES, JR. VA HOSPITAL

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Chronic insomnia is a major health problem for which the American College of Physicians recommends initial treatment with cognitive behavioral therapy. In regards to pharmacologic therapy, the recommended duration is no longer than 4 to 5 weeks. Despite that, the long-term use of benzodiazepines for managing insomnia remains highly prevalent. The long-term use of benzodiazepines has been associated with increased risk of cognitive impairment, delirium, falls, fractures, and motor vehicle accidents. Furthermore, the concurrent use of benzodiazepines and opioids can increase the risk of respiratory depression and mortality. In an effort to reduce the number of veterans on high-dose benzodiazepines and concurrent opioid therapy, a pilot benzodiazepine taper clinic was completed from March 2016 to June 2016 at the Edward Hines, Jr. VA Hospital. To facilitate the use of non-benzodiazepines for the treatment of insomnia, an insomnia order menu was implemented in June 2016. The purpose of this quality improvement project is to evaluate the impact of a pilot benzodiazepine taper clinic and insomnia order menu on the prescribing of insomnia medications. This is a data analysis project evaluating the changes in prescribing patterns of melatonin, trazodone, zolpidem, diphenhydramine, and temazepam from January 2016 through December 2016. The endpoints include the number of patients receiving each prescription and the number of 30-day supplies. Among patients with temazepam prescriptions, we will also evaluate the number of prescribers, the total daily doses of temazepam, the number of patients who are >65 years of age, and the number of patients on concurrent use of temazepam and opioids. The project is currently in progress and results will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review the risks associated with the use of benzodiazepines
Identify non-benzodiazepine therapeutic options for the management of insomnia

Self Assessment Questions:

Which of the following is an adverse effect associated with benzodiazepines?

- A: Delirium
- B: Respiratory depression
- C: Falls and hip fractures
- D: All of the above

HP is a 75 y/o M with insomnia who reports no improvement in sleep with melatonin and would like to try another agent. Which of the following would you recommend?

- A: Diphenhydramine
- B: Zolpidem
- C: Trazodone
- D: Temazepam

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-914L05-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF THE ADDITION OF A THIRD ORAL DIABETIC AGENT TO METFORMIN PLUS A SULFONYLUREA IN THE VETERAN POPULATION

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Purpose: According to the American Diabetes Association (ADA), 9.3%, or 29 million Americans had diabetes in 2012. When looking the group of people age 65 and older the percentage of Americans with diabetes increases to 25.9%, which is around 11.8 million seniors. This age group encompasses the majority of patients being treated in a Veterans Affairs setting making studies in knowing how to most effectively manage patients with type 2 diabetes crucial. Controlling type 2 diabetes with oral medications becomes increasingly difficult when multi-drug therapy is required to achieve A1c goals. At our facility, metformin is most often used as the first-line oral agent for treating type 2 diabetes followed by a sulfonylurea for those not adequately controlled on metformin monotherapy. Despite taking this two drug regimen, many patients will require additional A1c lowering with a third medication to meet therapeutic goals and they are often resistant to initiation of insulin. Head to head trials comparing third line oral diabetes medications when added to metformin plus a sulfonylurea are somewhat limited, therefore the purpose of this research is to compare the efficacy and safety of three third-line oral diabetes medications used at a veterans affairs hospital in Huntington, WV through a retrospective chart review. Methods: A retrospective chart review will be completed for patients taking metformin and a sulfonylurea who have been prescribed acarbose, saxagliptin, or pioglitazone as a third oral diabetes agent. Change in A1c will be evaluated and percentage of patients meeting A1c goal of <7%. Change in BMI, time to insulin initiation, and adverse events will also be examined. Results: Data is currently being collected and analyzed. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Outline the American Diabetes Association guidelines of pharmacologic approaches to glycemic treatment
Identify items to consider when deciding between an alpha glucosidase inhibitor, dipeptidyl peptidase-4 (DPP-4) inhibitors, and thiazolidinediones as a third line agent including efficacy, compliance, and adverse effects/contraindications

Self Assessment Questions:

According to the American Diabetes Association guidelines at what initial A1c should it be considered to initiate dual combination therapy?

- A: $\geq 7\%$
- B: $\geq 8\%$
- C: $\geq 9\%$
- D: $\geq 10\%$

A 70 year old patient with type 2 diabetes mellitus presents to your ambulatory care clinic with an A1c of 7.8%. He is on Metformin 850mg three times a day and on glipizide 20mg twice a day before me

- A: Acarbose
- B: Saxagliptin
- C: Pioglitazone
- D: Insulin glargine

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-462L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENT CLINICAL DECISION SUPPORT TO OPTIMIZE PHYSICIAN OFFICE REFILL WORKFLOWS

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On a daily basis, clinic physicians and medical staff are faced with the burden of medication refill requests. Depending on how large the practice is, physician offices can encounter thousands of refill requests a month. Practices have noted that handling medication refill requests is a high-volume and repetitive task in primary care offices, with many steps and opportunities for errors. The standard refill workflow is as such: the nursing staff receives a request, they obtain patient information, present the information to the physician, then send refill approval or denial. According to one study, only 36.4% of physician offices had a formal written refill protocol that could be identified. Standardizing communication procedures with pharmacies can make refill requests easier to manage. A refill protocol can help improve efficiency by decreasing time spent on refilling medications, in turn making quicker turnaround times for the patients. In doing so, providers can spend their time working at the top of their license while improving quality of patient care and safety. The purpose of this project is to implement a refill protocol workflow that can streamline, standardize, and reduce waiting times for refills so providers' time is focused on improving patient outcomes. This quality improvement project was exempt from review by the Institutional Review Board. A taskforce of selected physicians, nurses, pharmacists, and information technology determined the medication groupings of similar medications and refill protocol criteria. A workflow and informatics build were developed to aid documentation of refill requests and timing of refills. Training sessions were given to the physician offices staff. Data was collected in a report and the timing of refills received and sent was compared with previous data before the protocol was in place. A summary of results and conclusions will be presented at the 2017 Great Lakes Residency Conference.

Learning Objectives:

Identify the risks and benefits of using an automated refill protocol within the physician offices workflow

Discuss the criteria and areas of development within the refill protocol to improve patient outcomes

Self Assessment Questions:

What is a benefit to creating medication refill protocols?

- A: Increase time spent searching through patient charts
- B: Improve patient safety and quality of care for patients
- C: Direct more time for providers to refill medications
- D: Decrease necessity for prior authorizations

What criteria should be included for a refill of lisinopril?

- A: Fasting blood sugar within the last year
- B: Blood pressure on record documented in the past 2 years
- C: Lipid panel within the last year
- D: Serum creatinine in past year

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-954L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF IV PUSH ANTIBIOTICS ON TIME TO EMPIRIC ANTIBIOTIC ADMINISTRATION TO SEPTIC PATIENTS IN THE EMERGENCY DEPARTMENT

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Statement of the Purpose: Empiric antimicrobial treatment of septic patients often requires multiple antibiotics. Combined with limited intravenous line access in an emergency department (ED) setting, it can be challenging to administer empiric antibiotics in a timely fashion. Intravenous push (IVP) administration of beta-lactams may expedite care and reduce mortality. The purpose of this study is to determine whether the utilization of IVP empiric beta-lactam antibiotics improves time to antibiotic administration and Surviving Sepsis Campaign 3-hour bundle compliance. This study will also assess 28-day mortality and hospital length of stay. Statement of the Methods Used: This is a retrospective, single-center, cohort study of patients who presented to the ED at Loyola University Medical Center between August 2015 and September 2016, received treatment for sepsis, and were subsequently admitted with a diagnosis of sepsis. Patients were identified for inclusion using the ED Sepsis Order Set. Patients were excluded if they had confounding disease states, such as cardiogenic shock, end-stage liver disease or acute decompensated heart failure, if they had improper or incomplete documentation, such as transfers from outside hospitals, or if they were diagnosed with sepsis on the floor. Summary of Results to Support Conclusions: Pending

Learning Objectives:

Discuss the literary evidence supporting the importance of administering empiric, broad-spectrum antibiotics in a timely fashion.

Identify the beta-lactam antibiotics that have data to support intravenous push administration.

Self Assessment Questions:

Which of the following is/are (a) benefit(s) of early administration of antibiotics as evidenced by available literature?

- A: Decreased mortality
- B: Lower rates of bacterial resistance development
- C: Less antibiotic-associated adverse effects
- D: A & C

Which of the following beta-lactam antibiotics has evidence to support IVP administration?

- A: Aztreonam
- B: Piperacillin-tazobactam
- C: Cefepime
- D: A & C

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-458L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DIURETIC PRESCRIBING, PHARMACOVIGILANCE AND CORRELATION WITH ADVERSE EVENTS IN AN OUTPATIENT GERIATRIC POPULATION

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Purpose: Thiazides are currently recommended as an initial therapeutic option for the treatment of hypertension in patients age 60 years and older by the Eighth Joint National Committee (JNC 8). Although recommended, this therapeutic class has potential adverse effects including electrolyte abnormalities, hypotension and increased serum glucose and uric acid levels. Appropriate monitoring of thiazides is paramount as the number of elderly patients continues to increase, and guidelines addressing monitoring of patients prescribed thiazide diuretics are limited. The objective of this study is to evaluate if appropriate monitoring practices for geriatric patients prescribed thiazide diuretic medications reduce rates of adverse drug effects. **Methods:** This is an investigator-initiated, single-center retrospective study that compared the adverse events found in geriatric patients receiving a thiazide who were appropriately monitored versus those who were not appropriately monitored. Patients seen in the outpatient clinics at University of Louisville Hospital age 65 years or older who were prescribed a thiazide from January to December 2015 were screened for inclusion. Patients were excluded if they carried a diagnosis of active cancer, end stage renal disease, or heart failure with reduced ejection fraction (defined as an ejection fraction <40%). The primary outcome of this study is to evaluate if appropriate monitoring practices for geriatric patients prescribed thiazide diuretic medications reduce rates of adverse drug effects. Secondary outcomes include the rate of development of individual adverse events including hypotension, new onset type 2 diabetes or gout, electrolyte abnormalities and falls. This study aims to investigate if adverse effects of thiazide diuretics can be avoided with appropriate monitoring practices, or if thiazide diuretics have the potential to cause adverse effects in the geriatric population regardless of monitoring by providers. This study has been approved by the University of Louisville Institutional Review Board (IRB). **Results:** Results/conclusions will be presented at 2017 Great Lakes Conference.

Learning Objectives:

Identify potential adverse effects of thiazide diuretics when used in the geriatric population.

Discuss pharmacokinetic changes in the geriatric population that contribute to the development of adverse events

Self Assessment Questions:

Which of the following is a pharmacokinetic change that occurs in the geriatric population?

- A: Decreased renal function
- B: Increased liver perfusion
- C: Decreased body fat
- D: No pharmacokinetic changes occur in the elderly

Which of the following is considered to be a common adverse effect of thiazide diuretics?

- A: Hyperkalemia
- B: Hyponatremia
- C: Hypertension
- D: Decreased serum glucose

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-642L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

VALIDATION OF A WEIGHT-BASED UNFRACTIONATED HEPARIN (UFH) PROTOCOL COMPARING ACTIVATED PARTIAL THROMBOPLASTIN TIME (APTT) TO THE ANTIFACTOR Xa (ANTI-Xa) ASSAY: A CASE-CONTROL STUDY

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Purpose: Since first described in 1953, there has been substantial clinical experience with aPTT monitoring for UFH; however, limitations have been identified. The aPTT is subject to preanalytic and biologic factors including time of blood sampling, the reagent, and coagulopathies affecting aPTT results. The antifactor Xa, however, works by quantifying the functional activity of heparin. This study will help to determine the efficacy and safety of transitioning to antifactor Xa monitoring for UFH infusions at a large tertiary community hospital.

Methods: The study is a single-center prospective, and future retrospective, case-control study comparing monitoring parameters for UFH infusions. Patients will be enrolled from October 1, 2016 through December 30, 2016 and followed until heparin therapy is discontinued. Study authors plan to consent 30 patients prospectively for the anti-Xa monitoring group. Patients will be referred to the primary investigator (PI) by order verification pharmacists. For those patients that meet inclusion criteria, the PI will contact the ordering physician before obtaining consent. Following physician approval, the PI will obtain informed consent. The aPTT control group will be identified retrospectively to match the anti-Xa monitoring group based treatment location (intensive care or general medicine) and heparin protocol (DVT/PE, Stroke, Mechanical Valve, and Cardiac/Arterial). Patients will be excluded if less than 18 years of age, breastfeeding or pregnant, unable to give informed consent, on heparin infusions for any other protocol not listed above, and patients on oral factor Xa inhibitors. The anti-Xa group and the control group will be compared to identify a difference in average time to therapeutic window, number of lab draws required to obtain a therapeutic level, proportion of patients who reach therapeutic level within 24 hours, average time within therapeutic window, and safety outcomes such as bleeding.

Results: Data collection and analysis is currently in progress. Results and conclusions will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review the current evidence for the antifactor Xa assay as a monitoring parameter for intravenous unfractionated heparin infusions.

Discuss the efficacy of a weight-based heparin protocol using either the aPTT or antifactor Xa assay to determine the benefit of changing monitoring parameters at a tertiary-care hospital.

Self Assessment Questions:

What biologic factor can influence the activated partial thromboplastin time but does not alter the antifactor Xa assay?

- A: Antithrombin deficiency
- B: Liver disease
- C: Obesity
- D: Impaired renal function

In the published literature, what efficacy and/or safety end point(s) was shown to be significantly improved by using the antifactor Xa assay?

- A: Number of lab draws
- B: Major bleeding
- C: Time in therapeutic window and time to therapeutic window
- D: Venous thromboembolism

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DEVELOPMENT OF AN ONCOLOGY SYMPTOM MANAGEMENT CLINIC

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Statement of the purpose: Oncolytic therapy is associated with a myriad of adverse drug events that often result in patients seeking emergency medical attention and multiple hospital admissions. Pharmacists can play a critical clinical role on the care team of these patients and provide valuable education and expertise on these cytotoxic medications. The purpose of this project is to determine the most common reasons oncology patients go to the emergency room after receiving chemotherapy and, in collaboration with the oncology physicians, proactively educate patients, manage these symptoms per developed protocols to prevent admissions, and ultimately design subsequent regimens to prevent similar occurrences in the future. Statement of methods used: Data collection targeted patients who had both outpatient chemotherapy infusions and subsequent emergency room encounters or hospitalizations within a period of 30 days. Within a three-month time period during the last year, there were 642 patients who met the criteria and came to the emergency department. Of these patients, 135 were targeted based on admission diagnosis with the potential to be an adverse effect of chemotherapy. Chart reviews were performed on a sample of 50 patients to determine if a link could be made to recent chemotherapy treatment. Over 50% of the reviewed patients experienced gastrointestinal related adverse effects so these symptoms were addressed first. Utilizing resources from MD Andersons Cancer Network as well as the National Comprehensive Cancer Network, information packets are being compiled for common cancers including lung, breast, and colon, along with common adverse effects associated with chemotherapy regimens. Patient education will include strategies for prevention, possible signs and symptoms to monitor, and tips for home management. Written protocols will be discussed with and approved by the oncologists and the P&T committee. Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the services provided by the pharmacist in this oncology collaborative practice.

Recognize chemotherapy regimens associated with high risk of gastrointestinal adverse effects.

Self Assessment Questions:

Identify the services provided by the pharmacist in this oncology collaborative practice.

- A Provide patient education and manage chemotherapy adverse effects
- B: Determine appropriate chemotherapy regimens for a patient's cancer
- C: Prescribe and administer appropriate medications to the patients
- D: Diagnose a patient's cancer and educate on available treatment options

Identify the chemotherapy agent with the highest level of emetogenic risk.

- A Etoposide
- B Carboplatin
- C Daunorubicin
- D Cisplatin

Q1 Answer: A Q2 Answer: D

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Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

NOVEL ATORVASTATIN AND ROSUVASTATIN EXTEMPORANEOUSLY COMPOUNDED ORAL SUSPENSIONS FOR INPATIENT USE

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Purpose: HMG-CoA reductase inhibitors (statins) provide many clinical benefits to patients in the acute care setting, especially after acute coronary and cerebrovascular events. Often these patients experience swallowing difficulties that make traditional administration of oral tablets difficult. Currently there are no commercially available liquid formulations for statins. Minimal publications which describe extemporaneously compounded suspensions of statins exist in the literature. Thus, developing a validated formula could prove advantageous in this patient population. The objective of this study is to formulate atorvastatin and rosuvastatin oral suspensions and confirm their physical stability and chemical integrity. Methods: As proof of concept, multiple suspensions for both atorvastatin and rosuvastatin were created with varying suspending, alkalizing, and preservative agents and stored under refrigeration (between 2 and 8 degrees Celsius) for seven days. After initial storage, these formulations were assessed for their organoleptic properties, pH, and physical stability. Chemical integrity, defined as maintaining at least ninety percent of the concentration of the active pharmaceutical ingredient, was further determined using high performance liquid chromatography (HPLC). The chromatography samples were kept at both controlled room temperature (between 20 and 25 degrees Celsius) and under refrigeration and were analyzed in triplicate after seven and thirty days to assign appropriate beyond-use dating and storage conditions. Results: Initial formulations of both atorvastatin and rosuvastatin suspensions demonstrated appropriate dissolution, pH, and stability profiles. Data from HPLC analysis are pending. Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify physical and chemical characteristics of an extemporaneously compounded oral suspension that are analyzed to ensure integrity

Describe drug properties that may impede proper dissolution in an aqueous extemporaneously compounded oral suspension

Self Assessment Questions:

Which of the following techniques best assesses chemical integrity of an extemporaneously compounded oral dosage formulation?

- A Dissolution study
- B: High Performance Liquid Chromatography (HPLC) analysis
- C: Therapeutic drug level monitoring
- D: pH analysis

Which drug property most affects dissolution in an aqueous oral suspension?

- A Salt form (calcium vs. sodium)
- B Bioavailability
- C Volume of distribution
- D Lipophilicity/Partition coefficient

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-882L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

UTILITY OF A NASAL SWAP METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS (MRSA) POLYMERASE CHAIN REACTION (PCR) TEST FOR GUIDING DE-ESCALATION IN PATIENTS WITH PNEUMONIA

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Purpose: A retrospective study completed at St. Marys Medical Center (SMMC) in 2016 concluded that the use of MRSA PCR testing of the nares might be a useful stewardship tool to guide the discontinuation of anti-MRSA antibiotics in patients with pneumonia. This study showed a 98.6% negative predictive value (NPV) for ruling out MRSA pneumonia. Since the conclusion of the Giancola study, SMMC implemented an order set that allows for vancomycin discontinuation when the MRSA PCR is negative. The primary objective of this study is to determine if the utilization of MRSA PCR to de-escalate antibiotics leads to a decrease in vancomycin days of therapy (DOT). **Methods:** This is a single-center, retrospective chart review study. Patients were included if they: were between the ages of 18 and 89 years old, received at least one dose of vancomycin for presumed healthcare-associated pneumonia (HCAP) or community-acquired pneumonia (CAP), had no documented MRSA infection from other sites, and had an MRSA nasal PCR screen completed within 24 hours of admission for the intervention group. Adult patients admitted with HCAP or CAP to SMMC between January 1, 2016 and May 31, 2016 served as a control group. Patients admitted between June 1, 2016 and December 31, 2016, made up the intervention group. Data collection includes: age, sex, admit date, discharge date, comorbidities, previous antibiotic exposure within 90 days, signs of clinical instability, vancomycin start date, vancomycin stop date, MRSA nasal PCR date and result, and sputum culture date, quality, and results if obtained. The primary endpoint of this study is to evaluate vancomycin DOT before and after the implementation of the protocol. Secondary endpoints include: in-hospital all-cause mortality, length of stay, drug cost savings if applicable, and 30-day readmission. Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review the MRSA PCRs negative predictability value and its utility in the de-escalation of vancomycin therapy

Recall St. Marys MRSA PCR protocol for the nares and apply it to appropriate patients

Self Assessment Questions:

Which of the following characteristics of the nasal MRSA PCR makes it desirable for ruling out MRSA pneumonia and discontinuing anti-MRSA therapy?

- A Low negative predictive value
- B: High negative predictive value
- C: Low positive predictive value
- D: High positive predictive value

Which patient should be initiated on St. Marys Medical Centers MRSA PCR protocol of the nares for possible de-escalation of vancomycin?

- A Resident of a long term care facility how complains of cough with f
- B An IV drug abuser who reports to the ER with chest pain and poss
- C A symptomatic patient growing gram positive cocci in the urine
- D A patient with possible community acquired pneumonia with no ev

Q1 Answer: B Q2 Answer: A

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Activity Type: Knowledge-based Contact Hours: 0.5
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PREDICTIVE VALUE OF THE 4T SCORE IN DETERMINING HEPARIN INDUCED THROMBOCYTOPENIA (HIT) IN CARDIAC SURGERY PATIENTS

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Purpose: The 4T score is a clinical scoring system used to predict HIT, an immune-mediated adverse drug reaction. Components of the 4T score include magnitude of thrombocytopenia, timing of thrombocytopenia with respect to heparin exposure, thrombosis or other sequelae of HIT, and likelihood of other causes of thrombocytopenia. Application of the 4T score in cardiac surgery patients is often difficult, largely due to a number of known risk factors for thrombocytopenia, including intravascular devices, exposure to extracorporeal circuits, such as cardiopulmonary bypass and hemofiltration, and intraoperative heparin exposure. Therefore, the purpose of this retrospective cohort study is to determine the predictive value of the 4T score and to identify clinical predictors of HIT in this patient population. **Methods:** A retrospective chart review will be conducted at Rush University Medical Center from September 1, 2011 - August 30, 2016. All patients at least 18 years of age who underwent a coronary artery bypass graft, valve replacement, valve repair, or dissection repair and had a HIT antibody ordered will be eligible for inclusion in this study. Patients with a previously documented heparin allergy or requiring extracorporeal membrane oxygenation will be excluded. The primary outcome is the negative predictive value of a low 4T score and the positive predictive value of an intermediate and high 4T score for the development of HIT in cardiac surgery patients. The secondary outcome is to determine predictors that may be specific for identifying HIT in this patient population. Data collection will include: patient demographics, Sequential Organ Failure Assessment (SOFA) score, type of cardiac surgery, presence of thrombosis, time on cardiopulmonary bypass, intraoperative heparin dose, intravascular devices, renal replacement therapy, and hospital and ICU length of stay. **Results/Conclusion:** Data collection is currently in progress. Results and conclusions will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss risk factors for thrombocytopenia in cardiac surgery patients and current literature on HIT in critically ill patients

Identify the predictive value of the 4T score for HIT in cardiac surgery patients

Self Assessment Questions:

Which of the following is a risk factor for thrombocytopenia in cardiac surgery patients?

- A Hypotension
- B: Exposure to extracorporeal circuits, such as cardiopulmonary bypa
- C: Prolonged mechanical ventilation
- D: Malnutrition

Based on available literature, which of the following was concluded regarding the predictive value of 4T score in the SICU and CICU patients?

- A This patient population has few risk factors for thrombocytopenia
- B BMI > 40 is an established predictor for HIT in this population
- C HIT was over treated in SICU and CICU patients
- D The 4T score has a strong positive predictive value for HIT in this

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-678L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF VANCOMYCIN LOADING DOSES ON CLINICAL OUTCOMES IN MRSA PNEUMONIA AND BACTEREMIA

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Background: Vancomycin is a large molecule glycopeptide antibiotic with a broad gram-positive spectrum of activity, including methicillin-resistant *Staphylococcus aureus* (MRSA). Over the last 30 years, MRSA infection rates and vancomycin use have risen leading to an increase in resistant isolates and a growing number of treatment failures. Current consensus from the American Society of Healthcare-System Pharmacists, Infectious Diseases Society of America, and Society of Infectious Diseases recommend targeting a trough concentration of 15-20 mg/L for complicated infections caused by *S. aureus*. Furthermore, seriously ill patients should receive a vancomycin loading dose of 25-30 mg/kg. Studies evaluating the effect of administering a loading dose have primarily focused on the time to target trough. Data on clinical outcomes for patients who received loading doses is lacking in the literature. The purpose of this study is to evaluate the effect of administering a loading dose of vancomycin on 30 day mortality and 30 day readmission rates in patients with a confirmed MRSA infection. **Methods:** The study will be a retrospective, electronic chart review of Veterans at JBVAMC receiving intravenous (IV) vancomycin for the treatment of a confirmed MRSA pneumonia or bacteremia from January 1st, 2001 to August 23rd, 2016. Microbiology reports coupled with IV vancomycin prescription records will be utilized to screen and confirm Veterans prescribed vancomycin for an active MRSA pneumonia or bacteremia. Veterans will be placed in two groups: loading dose and non-loading dose. Data will be collected and evaluated to determine if a difference exists between groups for various clinical outcomes including 30-day mortality and readmission rates from the date of discharge. **Results/Conclusions:** Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify the target trough concentrations of vancomycin for various MRSA infections.

Discuss when loading doses of vancomycin should be considered.

Self Assessment Questions:

Which of the following MRSA infections does NOT require a target trough concentration of 15-20 mg/L?

- A Osteomyelitis
- B Cellulitis
- C Pneumonia
- D Endocarditis

Choose the best initial vancomycin dose for a 50 kg cancer patient with a port who is febrile and tachycardic with a leukocytosis suspected of having a bacteremia.

- A 1250 mg
- B 750 mg
- C 2000 mg
- D 1000 mg

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-550L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

THE IMPACT OF OFFERING A URINALYSIS WITH REFLEX TO CULTURE ON ANTIBIOTIC USAGE AND UTILIZATION OF URINE STUDIES FOR PATIENTS ADMITTED TO AN INTERNAL MEDICINE SERVICE

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Purpose: The overuse of antibiotics has led to complications such as greater antibiotic resistance and rising health care costs. One disease syndrome that has been evaluated is antibiotic use in urinary tract infections (UTIs). In an effort to reduce healthcare costs many hospitals have instituted reflex testing of urine specimens based on predetermined findings of a urinalysis. Studies have evaluated the use of urine studies, but there are inconsistencies in the literature whether a urinalysis with reflex to culture leads to a decrease in the number of urine cultures performed. In February 2016 Cleveland Clinic Akron General made a urinalysis with reflex to culture order available for patients admitted to the hospital. Although current literature supports that by utilizing urinalysis criteria to determine when to perform a culture results in a trend toward a decrease in antibiotic use, the impact of simply offering a urinalysis to reflex culture has not been evaluated. This practice would allow clinicians to reevaluate the need for a culture based on a clinical suspicion of UTI, hopefully reducing the number of cultures done on asymptomatic patients. It may also impact the use of antibiotics since clinicians are able to have a culture performed reflexively on a urine sample taken before antibiotics are given without ordering a urine culture on every patient. **Methods:** This is a retrospective, single center, pre-post study to assess the impact of offering a urinalysis to reflex culture on the usage of antibiotics and urine studies for adult patients on an internal medicine service. The impact on urine studies will also be assessed across the entire institution. **Conclusions:** Final results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recall patients that may require antibiotic treatment in asymptomatic bacteriuria

Recognize what criteria is needed for a urinalysis to be reflexively cultured

Self Assessment Questions:

If an organism grows in a urine culture and the patient has no presenting symptoms suggestive of a UTI (dysuria, increased frequency, fever, altered mental status), should the patient receive antibiotic

- A Yes, everyone needs antibiotics
- B Yes, but only in a subset of patients (ex: pregnant patients)
- C No, because the patient does not have a fever
- D No, because the urine specimen was a clean catch

Which of the following UA results would result in a reflexive culture according to Cleveland Clinic Akron Generals reflex to culture protocol?

- A WBC:0-2; leukocyte esterase: moderate; nitrites: none
- B WBC: 0; leukocyte esterase: none; nitrites: positive
- C WBC:10; leukocyte esterase: moderate ; nitrites: none
- D WBC: 4; leukocyte esterase: trace; nitrites: none

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-577L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PATIENT-CENTERED EDUCATION: TRADITIONAL WARFARIN COUNSELING VS. AN EXPERIMENTAL VIDEO SERIES

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Purpose: Warfarin has been identified by the Institute of Safe Medication Practices (ISMP) as a high-alert medication because when used incorrectly, it can cause significant harm to the patient. An effective way to minimize the risk of harm and error is through patient education.

Patient education on warfarin therapy has shown to improve anticoagulation control and reduce adverse events. The objective of this study is to investigate the most effective method of educating patients whether it be through traditional face-to-face counseling or through educational videos. **Methods:** This is a non-blinded, randomized study, which will be conducted at the Anticoagulation Management Services clinic at Floyd Memorial Hospital in New Albany, IN from October 1, 2016 to May 1, 2017. Men and women aged 18 or older who are new to warfarin therapy will be randomized to one of two experimental groups. One group will receive traditional face-to-face warfarin counseling and the other group will be shown a short educational video series about warfarin. Both groups will be educated on their warfarin therapy including administration and possible safety precautions. Traditional counseling and the video series will be conducted over four consecutive clinic appointments. Two weeks after the end of their educational sessions, study participants will be given an assessment to evaluate warfarin knowledge. Upon conclusion of the study, the reviewers will analyze the data to determine which group performed better on the warfarin assessment, thus providing means as to which educational method was more effective. Other data to be collected includes sex, age, race, primary language, education level, warfarin indication, and expected treatment duration. **Results:** Preliminary results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify tools that may be utilized to assess warfarin knowledge.

List major warfarin patient education content areas.

Self Assessment Questions:

What is the name of a validated and reliable tool used to assess warfarin knowledge?

- A Warfarin Education Scale
- B: Anticoagulation Knowledge Assessment
- C: Warfarin Knowledge Test
- D: Anticoagulation Education Exam

Which of the following are considered major warfarin patient education content areas?

- A Medication administration, diet, and cost
- B Medication interactions, diet, and pharmacokinetics
- C Medication administration, side effects, and cost
- D Medication monitoring, diet, and side effects

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-955L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EXPLORING THE CORRELATION OF INSULIN USE AND INPATIENT HYPOGLYCEMIC EVENTS

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Purpose Currently, inpatient hypoglycemia rates at Columbus Regional Hospital are higher than other hospitals in the state of Indiana. From reviewing previous data collected by the hospital, the morning is the time that most hypoglycemic events occur. The objective of this study is to determine if hypoglycemic events between the hours of 00:00 and 09:00 are being caused by a particular insulin regimen, and if so to identify the regimen. **Methods** Patients that had morning hypoglycemic events between June 2016 and August 2016, while on either formulary insulin glargine or formulary insulin lispro during their stay at the hospital will be reviewed, utilizing the electronic database. Hypoglycemic events will be defined as a blood glucose value of less than or equal to 70 mg/dL. The following data will be collected age, gender, the time of last administration of both insulin lispro and insulin glargine, the dose of each insulin administered, blood glucose values associated with date and time from the morning prior and morning after hypoglycemic event, diagnosis of type 1 or type 2 diabetes mellitus, glycosylated hemoglobin values (hemoglobin A1C), and diet status. All data collected will be confidential and contain no patient identifiers. This data will be trended to see if morning hypoglycemic events can be attributed to a specific insulin regimen, based on time of insulin administration and time of hypoglycemic event. Collection and analysis of the data is ongoing. Results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Recognize events that trigger inpatient hypoglycemia

Discuss the 2017 American Diabetes Association classification of hypoglycemia

Self Assessment Questions:

What can be a trigger of inpatient hypoglycemia?

- A Patient diet status changes from "NPO" to "Regular Diet"
- B: Inappropriate timing of short-acting insulin in regards to meals
- C: Increased infusion rate of IV dextrose
- D: Increase in corticosteroid dose

What blood glucose does the 2017 American Diabetes Association's Standards of Care define as clinically significant hypoglycemia?

- A 70 mg/dL
- B 50 mg/dL
- C 54 mg/dL
- D Hypoglycemia associated with severe cognitive impairment

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-477L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EFFECT OF PHARMACIST VERIFICATION ON FLUOROQUINOLONE ORDERS IN THE EMERGENCY DEPARTMENT

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Purpose: The Food and Drug Administration (FDA) recently released safety alerts regarding appropriate indications for fluoroquinolone use. In patients who have other treatment options available for acute bacterial sinusitis, bronchitis, and uncomplicated urinary tract infections, the risk of serious side effects outweighs the benefit of fluoroquinolone use. Based on the FDA's safety communication and trends in the study institutions' antibiogram, fluoroquinolones were removed from automated dispensing cabinets. The objective of this study was to determine the effect on time to administration and appropriate empiric therapy after implementation of required pharmacist verification of ED fluoroquinolone orders. **Methods:** This study was submitted to the Institutional Review Board for approval. A data surveillance system was used to identify all fluoroquinolone orders originating in the ED for a three-month period both prior to and after the implementation of required pharmacist verification. The data collected included: time of order entry, time of nurse acknowledgement, time of verification, time of administration, antibiotic indication, and fluoroquinolone dosing. The primary outcome of this study was to determine the effect of pharmacist verification on time to administration. The secondary outcome of this study was to observe if pharmacist verification improves appropriateness of empiric therapy. If time to administration does not prove to be significantly delayed and empiric therapy choice proves to be more appropriate, this data could be used to support the eventual removal of all antibiotics from automated dispensing cabinets. **Results:** Analysis of completed data collection showed that pharmacist verification of ED fluoroquinolone orders did not delay time to administration of antibiotics and decreased the use of fluoroquinolones as empiric antimicrobial therapy. Full results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify possible serious adverse effects of fluoroquinolone use.
Recognize appropriate indications for empiric fluoroquinolone use.

Self Assessment Questions:

Which of the following is NOT a serious adverse effect of fluoroquinolone use?

- A: Tendon rupture
- B: Renal failure
- C: QT prolongation
- D: Peripheral neuropathy

Select the most appropriate indication for empiric fluoroquinolone use?

- A: 61 year old male with chronic bronchitis
- B: 34 year old healthy female with acute cystitis
- C: 86 year old female with hospital-acquired pneumonia
- D: 22 year old male with acute sinusitis

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-829L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PHARMACIST EVALUATION OF MEDICATION THERAPY MANAGEMENT SERVICES IN THE ACUTE CARE SETTING FOR OLDER ADULTS WITH FALL HISTORY (PHELL)

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Purpose: Transitions of care (TOC) challenges include medication reconciliation discrepancies, inadequate patient education, communication breakdown between healthcare providers, lack of follow-up, and adverse drug events. Medication Therapy Management (MTM) services at hospital discharge may address several of these TOC challenges. Providing MTM at TOC, specifically hospital discharge, allows for immediate resolution of medication-related problems and can improve patient medication adherence. Scarce data exists evaluating MTM implementation in the acute care setting at hospital discharge. The primary objective is to describe and compare fall-related discharge medication interventions in patients who receive Fall Related Discharge Medication Education (FRDME) services as compared to standard of care (SOC). **Methods:** This single-center, retrospective, before-and-after, matched cohort study evaluated the FRDME service at an academic medical center. Patients ≥65 years old admitted to the trauma or orthopedic services with injuries after acute fall after January 1, 2016, were eligible for inclusion. Pregnant women and prisoners were excluded from the study. Groups were matched based on disposition to home versus healthcare facility. Patients who received FRDME were compared to a pre-FRDME SOC cohort. FRDME service includes specific interventions (i.e., medication; education; follow-up referral) with patients eligible for MTM or education only based on insurance coverage. Primary outcome of interventions was compared in the pre- and post-FRDME groups. Secondary outcomes included the comparison of 30-day readmission rates, Hospital Consumer Assessment of Healthcare Providers and Systems scores, and economic impact. Economic impact was assessed through MTM charges and direct medication copayments for discharge prescriptions. Statistical analyses were performed using SigmaPlot version 13.0. Categorical data was analyzed using chi-square or Fisher exact test, as appropriate. Continuous data was analyzed using student's t-test or Wilcoxon rank sum, as appropriate. **Results:** Data collection and analysis are ongoing.

Learning Objectives:

Discuss transitions of care (TOC) challenges and the pharmacist's role in TOC.

Recognize fall risk factors in older adults and pharmacy-related interventions to reduce fall risk.

Self Assessment Questions:

What is the most common adverse event after hospital discharge?

- A: Procedure-related adverse event
- B: Nosocomial infection
- C: Adverse drug event
- D: Fall

Which medication class is most closely associated with an increased fall risk in older adults?

- A: Antipsychotics
- B: Antihistamines
- C: Antihypertensives
- D: Antiepileptics

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-684L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

FINDING THE RIGHT PATH: THE DEVELOPMENT AND IMPLEMENTATION OF AN ACUTE MYELOID LEUKEMIA CLINICAL PATHWAY IN A LARGE ACADEMIC MEDICAL CENTER

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The use of clinical pathways in oncology has become increasingly more prevalent to improve patient care by providing the optimal course for a patient's specific diagnosis. Currently, no clinical pathway for the treatment of AML has been implemented at the University of Wisconsin Carbone Cancer Center (UWCCC). The purpose of this project is to develop and implement a clinical pathway for the treatment of acute myeloid leukemia to ensure high-quality and high-value care for the patients treated at the UWCCC. The development of the clinical pathway will be in accordance with recommendations provided by the American Society of Clinical Oncology. One to two regimens will be identified as clinical pathway preferred for induction, consolidation and relapsed/refractory disease treatment phases. Appropriate clinical trial enrollment will be promoted. Guidance on post-treatment follow up will be provided. Post implementation data will be collected and analyzed to report on compliance, efficacy, safety, and value outcomes. An assessment of primary literature and institution outcomes of current treatments for induction, consolidation, and relapsed/refractory disease will be performed. A multidisciplinary workgroup was organized to oversee AML clinical pathway creation with final approval from the physician led leukemia disease oriented team. Preliminary institutional data on refractory AML patients treated between 2009-2015 (n=37) includes the use of 13 different re-induction regimens, 30 day overall survival rate of 94% and 1 year overall survival rate of 39%. Of the patients alive at one year 73% had undergone a hematopoietic stem cell transplant. Tools to improve electronic physician order entry of supportive care and diagnostic testing are in development. The final result of this project will be an implemented comprehensive clinical oncology pathway for the treatment of acute myeloid leukemia at UWCCC. The clinical pathway will provide an increase in efficacy, safety, and value of care for patients undergoing intensive treatment.

Learning Objectives:

Discuss the importance of clinical pathways in oncology care and explain why acute myeloid leukemia is an ideal disease state that would benefit from implementation of a clinical pathway
Describe the process of clinical pathway development and implementation

Self Assessment Questions:

What diseases benefit most from clinical pathways?

- A: Common diseases
- B: Diseases with high risk and/or high cost therapies
- C: Diseases with multiple treatments of equal efficacy and safety
- D: All of the above

Which key stakeholder must be included in clinical pathway development?

- A: Pharmacist
- B: Physician
- C: Nurse
- D: All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-566L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATING ENOXAPARIN DOSING FOR VENOUS THROMBOEMBOLISM PROPHYLAXIS IN LOW BODY WEIGHT PATIENTS

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Purpose: It is hypothesized that low body weight patients receiving enoxaparin for venous thromboembolism prophylaxis have an increased bleeding risk. The literature supporting this hypothesis is limited to studies observing anti-factor Xa levels. However, current studies have not assessed the risk of bleeding. As a result, there is a lack of guidance for providers to decide when to reduce the dose of enoxaparin based on body weight. The objective of this study is to evaluate the impact of enoxaparin dosing on major and minor bleeding events in patients who weigh less than 45 kg. Methods: This study was approved by the Institutional Review Board. The study is a retrospective, single-center review of patients at least 18 years of age with an actual body weight of less than 45 kg receiving enoxaparin (enoxaparin 40 mg daily, 30 mg twice daily, or 30 mg daily) for venous thromboembolism prevention between March 1, 2015 and September 30, 2016. Patients with a creatinine clearance of less than 30 mL/min and patients receiving oral anticoagulants were excluded from the study. The primary objective is to determine whether different enoxaparin doses correlate with changes in the incidence of major and minor bleeding. Major bleeding is defined as a hemoglobin drop of at least 2 g/dL in 24 hours, a transfusion of at least one unit of packed red blood cells, bleeding into a critical site (e.g., intracranial, intraocular, retroperitoneal, intraarticular, pericardial, or intramuscular with compartment syndrome), or bleeding to death. Minor bleeding is defined as overt bleeding not meeting the criteria for major bleeding (e.g., gastrointestinal bleeding, hematuria, hematemesis, or hematochezia). Secondary objectives include comparing the incidence of venous thromboembolism, defined as a diagnosis of deep venous thrombosis or pulmonary embolism. Results/Conclusions: Will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Define the incidence of major and minor bleeding events with varying doses of enoxaparin for venous thromboembolism prophylaxis in patients with a body weight of less than 45 kg.
Select the appropriate dose of enoxaparin based on patient characteristics.

Self Assessment Questions:

Which of the following characteristics require a dose adjustment in patients on enoxaparin for venous thromboembolism prophylaxis?

- A: Age greater than 80 years
- B: Creatinine clearance less than 30 mL/min
- C: Body weight less than 45 kg
- D: B and C

What dose of enoxaparin does the manufacturer recommend for venous thromboembolism prophylaxis in patients with a body weight of less than 45 kg?

- A: Individualized dosing, consider utilizing clinical and laboratory monitoring
- B: Enoxaparin 40 mg daily
- C: Enoxaparin 30 mg twice daily
- D: Enoxaparin 30 mg daily

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-434L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF PROTON PUMP INHIBITOR EFFECT ON TYROSINE KINASE INHIBITOR THERAPY IN CHRONIC MYELOID LEUKEMIA PATIENTS

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Tyrosine kinase inhibitors (TKIs) including imatinib, nilotinib, and dasatinib are considered first-line treatment options for Chronic Myeloid Leukemia (CML). Patients have been shown to achieve faster and more complete responses if treated with nilotinib or dasatinib. The absorption of these two agents is maximized in an acidic pH, and have been shown to yield lower serum concentrations when co-administered with Proton Pump Inhibitors (PPIs). However, the clinical implications of this interaction have not been studied. The purpose of this study is to determine if concomitant administration of PPI and TKI agents impacts clinical response rates in patients with CML. This is a retrospective analysis of adult patients greater than 18 years of age who received imatinib, dasatinib, or nilotinib for CML while being seen at an outpatient oncology clinic of a 433-bed community hospital from July 2013 to July 2016. Included patients will be stratified based upon concomitant use of PPI and divided into two groups; those who received a PPI, and those who did not. Exclusion criteria include Philadelphia Chromosome-negative CML; use of Ritonavir, Phenytoin, or Phenobarbital; and treatment with bosutinib, omacetaxine, or ponatinib. The primary outcome of the study is rate of major molecular response at 12 months. Baseline demographics, laboratory data, time from diagnosis to initiation of treatment, dose intensity, duration of treatment, rate of progression, and mortality will be collected through a review of electronic medical records. Patient identifiers will be removed from all data to protect confidentiality. Study outcomes will be compared with Independent samples t-test, Mann Whitney U, chi-squared, and Fishers exact tests, depending on the type of data contained within each data set. Test will be found to be significant with a p-value of less than 0.05.

Learning Objectives:

Describe the chromosome translocation that results in Philadelphia chromosome-positive chronic myeloid leukemia.

Recognize second generation tyrosine kinase inhibitors approved as first line agents for the treatment of Philadelphia chromosome-positive chronic myeloid leukemia.

Self Assessment Questions:

Philadelphia chromosome-positive chronic myeloid leukemia is caused by the reciprocal translocation of which chromosomes?

- A: Chromosomes 9 and 12
- B: Chromosomes 19 and 21
- C: Chromosomes 9 and 22
- D: Chromosomes 12 and 15

Which of the following are second generation tyrosine kinase inhibitors approved to treat Philadelphia chromosome-positive chronic myeloid leukemia in the first-line setting? I. Dasatinib (Sprycel)

- A: I, iv
- B: I, ii, iv
- C: II, iv
- D: I, iii, iv

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-403L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION OF VENOUS THROMBOEMBOLISM (VTE) PROTOCOL TO DECREASE INCIDENCE OF POST-OPERATIVE VTE AT LUTHERAN HOSPITAL

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Purpose: The purpose of this quality initiative (phase I and phase II) study is to retrospectively and prospectively look at Lutheran Hospitals multidisciplinary teams adherence to national guidelines regarding venous thromboembolism (VTE) prophylaxis assessment and prevention. Our primary objective is to evaluate the efficacy of Caprini VTE risk assessment tool in preventing post-operative VTE. **Methods:** This study will be completed at Lutheran Hospital, Indiana. Authorization to complete this study was presented to the Lutheran Hospital institutional review board and was approved. The first phase of the study is a retrospective chart review of venous thromboembolism (VTE) events that occurred in hospitalized surgical and surgical patients from January 1, 2016 until implementation of the protocol. The protocol will assess whether appropriate prophylaxis was utilized prior to implementation of the VTE risk assessment tool. Our patient population included surgical and medical patients who were found to have a post-operative VTE event. The incidence of post-operative VTE at Lutheran hospital for the year 2015 was 43 and the goal is to reduce that rate by 50%. To determine appropriateness of VTE therapy in our patient population, we plan to utilize the Caprini thrombosis risk scoring method. The number of events that could have been prevented if a protocol and risk assessment was put into place will be analyzed. Phase II will prospectively look at the rate of decrease for VTE events post-operatively, using the proposed Caprini VTE risk assessment and treatment algorithm. The recommended treatment algorithm for VTE prophylaxis was created and presented to the committee. Once this algorithm is approved, the committee will then set a timeline to implement the use of the risk assessment tool to determine the appropriateness of VTE prophylaxis. **Results:** i) Retrospective Study: In progress ii) Prospective Study: In Progress **Conclusions:** In progress

Learning Objectives:

Select the appropriate VTE prophylaxis based on patients risk factors and renal function

Recognize risk factors for VTE

Self Assessment Questions:

Which of the following is the most appropriate VTE prophylaxis for a 75 year old man who is scheduled for extensive abdominal surgery.

Patients past medical history include prior DVT, diabetes, dyslip

- A: Heparin 5000 units twice daily
- B: Initiate Warfarin 5 mg daily
- C: Enoxaparin 30 mg twice daily
- D: Enoxaparin 40 mg twice daily

All of the following are risk factors for VTE except

- A: Abdominal surgery
- B: Obesity
- C: Cancer
- D: Vitamin D deficiency

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-609L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF EMERGENCY DEPARTMENT PHARMACY SERVICES ON THE TIME TO ADMINISTRATION OF ANTIBIOTICS

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Purpose: Implementation of a pharmacy service in an emergency department (ED) can contribute to safe and effective patient care. More specifically, the pharmacy service has the potential to decrease time to administration of antibiotics. Timely administration of antibiotics has been shown to improve outcomes in patients with severe infections such as sepsis, and subsequently antibiotics are recommended within one hour of diagnosis of septic shock and severe sepsis. The impact of the time to first dose in other infections, however, is unclear. Therefore, the purpose of this study is first to evaluate an ED pharmacy services impact on time to administration of antibiotics at a Veterans Affairs (VA) ED, and to then identify any potential impact on patient outcomes. **Methods:** A retrospective chart review of time to administration of antibiotics in a VA ED will be conducted, evaluating patients treated with and without the presence of an ED pharmacy service. Patients receiving at least one dose of an antibiotic in the ED will be included, and the timeliness of antibiotic administration will be compared for two equivalent timeframes, one before and the other after the introduction of ED pharmacy services. Patient outcomes to be assessed will include; total length of antibiotic therapy, length of hospital stay, 90-day hospital readmission rates related to the principle diagnosis, and 90-day mortality. Appropriateness of antibiotic dosing will be determined based on pre-specified ranges in accordance with current clinical guidelines and institutional practices. Other demographic data to be collected includes: patient age, gender, weight, renal function antibiotic and dose administered, time of order entry by physician, time of administration, and diagnosis (ICD9/10 codes). Patients will be excluded if they are discharged home directly from the ED or were transferred to or from another institution. **Preliminary Results/Conclusions:** Data collection and analysis are currently in progress.

Learning Objectives:

Describe the effect of time to antibiotic administration on patient outcomes based on the severity of infection

Recognize the ways in which a pharmacist can impact time to administration of antibiotics in the emergency department setting

Self Assessment Questions:

The Infectious Diseases Society of America recommends administration of broad-spectrum antimicrobials within which of the following periods of time after recognition of septic shock?

- A: 30 minutes
- B: 1 hour
- C: 4 hours
- D: 24 hours

Based on current evidence, timely antibiotic administration has been shown to impact morbidity and mortality with which of the following diagnoses?

- A: Community-acquired pneumonia
- B: Urinary tract infection
- C: Cellulitis
- D: Meningitis

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-760L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION AND EVALUATION OF A TRANSITIONAL PLAN OF CARE (TPOC) FOR PHARMACY SERVICE AT A VETERANS AFFAIRS MEDICAL CENTER

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Purpose: To facilitate strategic and tactical planning for Pharmacy Service that leads to the development of process improvement initiatives. The implementation of these projects will align with the departmental vision to be a nationally recognized leader in the provision of quality pharmaceutical care across the healthcare continuum. **Methods:** Prior to the start of FY17, pharmacy administration met to participate in a strategic planning retreat. This meeting was conducted utilizing the principles of LEAN process improvement. The creation and continuation of process improvement initiatives within Pharmacy Service was emphasized throughout the retreat. After determination of projects with highest value-added potential, focus was placed on the prioritization of projects among various value streams created by the administration team: USP 800, People, Standard Work, Technology, and Physical Space. Upon completion of the retreat, tasks were distributed among various members of Pharmacy Service for execution. The status of projects, staff involvement, and impact on both pharmacy and facility outcome measures will be continually assessed throughout the year to determine efficacy. **Results/Conclusions:** Results and conclusions are pending and will be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify three core principles of LEAN process improvement.

Discuss the prioritization and arrangement of process improvement initiatives within Pharmacy Service at the Indianapolis VA.

Self Assessment Questions:

LEAN process improvement places an emphasis on which of the following?

- A: Creation of complex workflow processes
- B: Avoidance of strategic planning
- C: Elimination of waste and adoption of value-added activities
- D: Use of supervisors as the sole members of a process improver

Which of the following is a value stream identified by Pharmacy Service at the Indianapolis VA?

- A: Employee credentialing
- B: Usp <800>
- C: Recruitment and retention
- D: Leadership development

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-824L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PHARMACIST INTERVENTION ON SEVERE SEPSIS AND SEPTIC SHOCK COMPLIANCE USING ELECTRONIC ALERTS IN A COMMUNITY HOSPITAL EMERGENCY DEPARTMENT

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Purpose: To determine the impact of a mobile electronic alert and other pharmacy-driven initiatives on Center for Medicare and Medicaid Services (CMS) severe sepsis and septic shock compliance in the emergency department (ED) as well as clinical secondary outcomes of decreased hospital length of stay and inpatient mortality. **Methods:** A single center, before-and-after chart review of patients >18 years that are identified by ICD-10 codes pre-intervention and by a systemic inflammatory response syndrome (SIRS) criteria and/or organ dysfunction mobile alert post-implementation who initially present in the ED from January 1, 2016 to December 31, 2017 are included in the study with a goal of 100 patients in each arm. Mobile electronic alerts prompt pharmacists to evaluate patients with SIRS criteria and/or organ dysfunction allowing them to ensure appropriate antibiotic therapy, fluid resuscitation, documentation, and reassessment. The implementation of this process in the ED will serve as a pilot, which if successful, will be applied to the entire hospital. **Preliminary Results:** Since pharmacist involvement began on October 19, 2016, ED monthly compliance to the CMS measure has increased to an average of 90%. During the months of November and December, pharmacists made a total of 53 interventions which resulted in a 19% average increase in overall compliance. **Preliminary Conclusions:** Due to 24-hour pharmacist intervention on mobile electronic alerts, compliance to the CMS measure in the ED has increased in the month of November and December. Additionally, compliance to appropriate antibiotic administration, fluid administration, and culture draws shows a trend towards improvement and should further increase with continued pharmacy support.

Learning Objectives:

Identify appropriate antibiotic therapy and fluid administration necessary to be compliant with the CMS Sepsis Core Measure

Discuss interventions pharmacists can make to increase CMS Sepsis Core Measure compliance

Self Assessment Questions:

What volume per kilogram of crystalloid fluid would you give a patient with a MAP <65 mmHg in order to comply with the CMS Sepsis Core Measure?

- A 10 ml/kg
- B: 20 ml/kg
- C: 30 ml/kg
- D: 40 ml/kg

Which of the following steps should be confirmed prior to verifying an antibiotic order for a septic patient?

- A Lactate has been drawn
- B Cultures have been drawn
- C Fluid boluses have been administered
- D A sepsis order set has been initiated

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-977L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF ALCOHOL WITHDRAWAL PRACTICES AT A COMMUNITY HOSPITAL

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Purpose: In 2010, 1.9 million people discharged from the hospital had at least one alcohol-related diagnosis. Mortality rates of alcohol withdrawal syndrome (AWS) are estimated to be as high as 15% in untreated patients versus 2% in treated patients. At Ascension/Wheaton Franciscan-St. Joseph Hospital, an alcohol withdrawal protocol is initiated in patients experiencing AWS, and the Clinical Institute Withdrawal Assessment for Alcohol (CIWA-Ar) scores are used to assess the severity of alcohol withdrawal symptoms. The purpose of this study is to assess the utility of and adherence to the alcohol withdrawal protocol at Ascension/Wheaton Franciscan-St. Joseph Hospital. **Methods:** A retrospective chart review will be conducted utilizing electronic health records to identify patients admitted to Ascension/Wheaton Franciscan-St. Joseph Hospital diagnosed with AWS during a three month period. The primary objective is to determine adherence to the alcohol withdrawal protocol. To assess this objective, patient charts will be reviewed to see if the protocol was ordered in patients undergoing AWS, and if the appropriate amount of benzodiazepines were administered in response to CIWA-Ar scores. Secondary objectives include describing the patient population being treated for AWS at Ascension/Wheaton Franciscan-St. Joseph Hospital; discover if patients are being discharged home with medications to help treat or prevent withdrawal; and to identify an optimal medication regimen for alcohol withdrawal. All information will be maintained confidentially. Data will be analyzed using the appropriate statistical tests. Chi squared test will be used for categorical variables and a t-test will be used for continuous variables. Statistical significance will be at $p < 0.05$. To assess for influence of confounding factors multiple linear regression will be used. **Results/Conclusion:** Results and conclusions will be presented at Great Lakes.

Learning Objectives:

List the four stages of alcohol withdrawal

Identify the treatment of choice for patients undergoing alcohol withdrawal

Self Assessment Questions:

What is the order of the four stages of alcohol withdrawal?

- A Delirium tremens, Seizures, Alcoholic hallucinosis, Autonomic hyp
- B: Alcoholic hallucinosis, Delirium tremens, Seizures, Autonomic hyp
- C: Autonomic hyperactivity, Delirium tremens, Alcoholic hallucinosis,
- D: Autonomic hyperactivity, Alcoholic hallucinosis, Seizures, Delirium

What is the treatment of choice for alcohol withdrawal?

- A Benzodiazepines
- B Ethanol
- C Dexmedetomidine
- D Antipsychotics

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-426L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF A NEW PHARMACIST STAFFING MODEL IN A PRIMARY CARE OFFICE

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Background: Ambulatory care pharmacists at Mercy Health Muskegon co-manage chronic conditions, educate patients on medications and disease states, and serve as a resource to the healthcare team in 12 physician offices across the Mercy Health network. The traditional mode of pharmacist staffing in these primary care offices consists of independent patient appointments with the pharmacist based on provider referral. Baseline data was collected in the fall of 2016 at a resident-run family medicine clinic that utilizes the traditional pharmacist staffing model. This data showed that the pharmacist sees an average of 3 patients by appointment each day and answers an average of 1 drug information or clinical question from medical residents over a 10 hour work day. This translates to a daily average of 159 minutes that the pharmacist spends in patient care.

In December of 2016, a new pharmacist staffing model was implemented at a resident-run internal medicine clinic. In this new model, the pharmacist not only sees patients by appointments through provider referral, but is also integrated into the medical team by sharing an office space with the medical residents and their preceptor. This allows the pharmacist to be easily accessible for questions, consults, and inclusion in medical resident patient appointments.

Purpose: To determine how much time the pharmacist spends in patient care in the new staffing model compared to the traditional staffing mode in primary care offices.

Methods: The pharmacy resident staffing the new medical resident-run internal medicine clinic collected data in a spreadsheet that included number of pharmacist appointments, number of physician appointments, number of physician appointments attended, number of drug information questions, number of patients counseled, number of pharmacist interventions, number of dose changes, number of medication changes, and total time spent in patient care.

Results: In progress

Conclusion: In progress

Learning Objectives:

Recognize potential benefits of pharmacist involvement in patient care on clinical outcomes.

Identify techniques for successfully integrating a pharmacist into a primary care office.

Self Assessment Questions:

Which of the following patient outcomes can occur when pharmacists are involved in patient care?

- A Helping patients achieve their goal HbA1c
- B Decreasing LDL cholesterol by encouraging statin use
- C Lowering blood pressure with appropriate anti-hypertensives
- D All of the above

Which of the following is a barrier to successful integration of a pharmacist into a primary care office?

- A Developing a pharmacist job description and sharing with the rest
- B Avoiding working with complex patients that will require advanced
- C Ensuring pharmacist visibility and accessibility to the rest of the team
- D Being proactive with patient care and taking responsibility for patient

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ASSESSING THE EFFICACY OF MULTIMODAL ANALGESIA PROTOCOL IN ORTHOPEDIC SURGICAL PATIENTS IN A COMMUNITY HOSPITAL

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Purpose: Traditionally, intravenous opioids in the form of patient-controlled analgesia have been used to manage postoperative pain after joint reconstruction. Opioids are associated with numerous dose dependent systemic side effects which can impair recovery. The principle of multimodal analgesia therapy is to use interventions that target several parts of the pain pathway, allowing more effective pain control with fewer side effects. Recent literature suggests that a multimodal analgesia protocol (MAP) decreases opioid consumption, increases patient satisfaction and decreases length of stay for orthopedic surgical patients. Ingalls Memorial Hospital (IMH) began using MAP for orthopedic surgery effective October 1, 2016. The purpose of this study is to assess the efficacy of MAP at IMH. **Methods:** Prospective cohort study at IMH in Harvey, IL. All patients who underwent total knee replacement (TKR) or total hip replacement (THR) between September 1, 2016 and November 30, 2016 will be identified through Cerner - Soarian surgical list generator (North Kansas City, MO). Objectives were compared between two groups: before and after implementation of MAP. Study endpoints included appropriate utilization of MAP, amount of opioids used in morphine equivalents, length of stay, adverse effects, continuation of MAP after discharge and average pain score. Patients were included if they were at least 18 years of age and if they underwent either TKR or THR. **Results/Conclusions:** Results and conclusions will be presented at the Great Lakes Pharmacy Resident conference.

Learning Objectives:

Explain the rationale of using a multimodal analgesia protocol after orthopedic surgeries.

Recognize an optimal regimen after orthopedic surgeries.

Self Assessment Questions:

What is the rationale for using a multimodal analgesia protocol after orthopedic surgeries?

- A To decrease adverse effects seen with opiate use
- B To increase patient satisfaction
- C To decrease length of stay
- D To decrease adverse effects seen with opiate use, increase patient

What is the optimal regimen after orthopedic surgeries?

- A Patient controlled analgesia for the first 24 hours after surgery
- B IV opiates
- C Multimodal analgesia
- D A sustained released opiate with immediate release opiates for breakthrough

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

CHARACTERISTICS OF POSTGRADUATE YEAR TWO (PGY2) AMBULATORY CARE PHARMACY RESIDENCY PROGRAMS ACROSS THE COUNTRY

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Purpose: The objective of this project is to describe characteristics of postgraduate year two (PGY2) ambulatory care pharmacy residency programs across the country. The information gathered by respondents will be analyzed to share trends as well as highlight unique attributes of the programs. This project will provide insights into structure and function of PGY2 ambulatory care residency programs at this point in time to guide current and newly emerging programs. **Methods:** A 24 question survey was developed by pharmacists and faculty engaged in student and resident training in ambulatory care and pilot-tested by practitioners and trainees. The survey is being distributed using Qualtrics online survey software, and includes multiple choice and open ended questions. The survey identifies key characteristics of each program including, but not limited to: single-site and multi-site program type, primary site characterization, number of residents, length and type of rotations, staffing requirements, additional residency activities, precepting and teaching opportunities, training and credentials of the Residency Program Director, and number of preceptors and their qualifications. The survey will be distributed to 138 PGY2 Ambulatory Care Pharmacy Residency Program Directors (RPD) in February 2017. Participants have four weeks to complete the survey. Participants that do not respond to the initial email will be sent up to two email reminders, one week and two weeks after the initial survey is sent; one phone call follow-up will be made to those that do not respond to the emails. Due to the nature of this study, descriptive statistics will be used to summarize data. This study was determined exempt by the Ohio State University Institutional Review Board. **Results/Conclusions:** Data collection in progress. Results and conclusions will be presented at the 2017 Great Lakes Residency Conference.

Learning Objectives:

Describe the history of pharmacy residency programs.

List characteristics of PGY2 Ambulatory Care Pharmacy Residency programs across the country.

Self Assessment Questions:

In what year were pharmacy residency programs first accredited by the American Society of Health-System Pharmacists (ASHP)?

- A: 1958
- B: 1963
- C: 1971
- D: 1985

The 2014 ASHP Ambulatory Care Summit used all of the following to define ambulatory care pharmacy EXCEPT:

- A: Addressing medication needs
- B: Developing sustained partnerships with patients
- C: Recommending fiscally responsible medication therapy
- D: Practicing in the context of family and community

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-755L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF THE SAFETY AND EFFICACY OF APIXABAN (ELIQUIS) IN PATIENTS WITH RENAL DYSFUNCTION

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Stroke and venous thromboembolism (VTE) are in many cases a life threatening event. Safe and effective treatment is crucial to survival and quality of life post event. Apixaban is a direct oral acting anticoagulant (DOAC) and is approved for the treatment of VTE and stroke prevention for non-valvular atrial fibrillation. All DOACs require renal dose adjustment and are poorly studied in patients with severe renal dysfunction and end-stage renal disease (ESRD) requiring hemodialysis. Apixaban is unique among the DOACs in that it does have limited data to support its use in patients on hemodialysis. The purpose of this study is to evaluate the safety and efficacy of apixaban versus warfarin in patients with creatinine clearance (CrCl) < 25 mL/min to help guide clinical decision making in this specific patient population. A second arm of this study is evaluating the safety and efficacy of triple therapy (dual antiplatelet therapy + anticoagulation). This is a multicenter, retrospective study conducted at the following institutions: Detroit Medical Center, St. John Health System, University of Michigan Health System, Henry Ford Health System, and Beaumont Health System. Patients aged 18-89 were included in this arm of the study if they had a CrCl < 25 mL/min and had been administered apixaban. Patients were excluded if they were documented as pregnant during the study term and/or had less than 45 days of anticoagulation with apixaban. Each hospital used their electronic medical record to identify patients who were initiated on apixaban or triple therapy in hospital and subsequently discharged. Safety and efficacy will be evaluated by determining major bleeding and thrombosis rates with use of apixaban versus warfarin in patients with CrCl < 25 mL/min.

Learning Objectives:

State the incidence of stroke and venous thromboembolism (VTE) in the United States.

Describe the strength of evidence available for use of apixaban in severe renal dysfunction.

Self Assessment Questions:

Stroke and venous thromboembolism (VTE) combined affect approximately how many people in the United States yearly?

- A: 700,000
- B: 1,000,000
- C: 1,300,000
- D: 1,600,000

AJ is an 81 YO M weighing 73 kg height 56" who presents for management of his chronic atrial fibrillation. The patient is on warfarin and has a history of labile INR. His PMH is also significant for

- A: Switch to apixaban 5 mg BID
- B: Continue warfarin (INR goal 2.5-3.5)
- C: Switch to apixaban 2.5 mg BID
- D: Continue warfarin (INR goal 2-3)

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-710L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EFFICACY AND SAFETY OF CONTINUOUS INFUSION VERSUS BOLUS DOSING OF NEOSTIGMINE IN ACUTE COLONIC PSEUDO-OBSTRUCTION

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Purpose: Acute colonic pseudo-obstruction (ACPO) can occur in a diverse population of medical and surgical patients. Spontaneous perforation in patients with ACPO is associated with a 50% mortality rate. Supportive management includes gastric decompression, and elimination or correction of factors predisposing or prolonging ACPO. Current guidelines recommend cholinesterase inhibitors in patients who don't respond to supportive therapy. Neostigmine is a reversible cholinesterase inhibitor that can recover colonic motility by reversing parasympathetic blockade. Currently available data assessing the effect of cholinesterase inhibitors on ACPO are limited to small case series and clinical trials. Available data do not directly compare outcomes in patients who receive neostigmine as either IV push or continuous infusion. At the Indiana University (IU) Academic Health Center, patients may receive neostigmine as IV bolus or continuous infusion, per prescriber discretion. The purpose of this study is to assess clinical success rates at IU Health Methodist Hospital, in patients receiving IV bolus compared to continuous infusion neostigmine. **Methods:** This is a retrospective review of medical and surgical patients > 18 years old who received neostigmine for treatment of ACPO at IU Methodist Hospital. Patients less than 18 years old, prisoners, pregnant females, patients on chronic cholinergic agonists, and those who received neostigmine perioperatively will be excluded. The primary outcome will be occurrence of a bowel movement within 12 hours of neostigmine infusion. The secondary outcome will be the total dose required for clinical effect and total duration of therapy. The safety outcome will be bradycardia requiring atropine administration and bowel perforation. The primary end point will be categorical and will be analyzed using chi-square. The secondary end point will be continuous and will be analyzed using Mann-Whitney U test. The safety outcomes will be analyzed using Fisher's Exact test. **Results/Conclusion:** Results will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Define acute-colonic pseudo obstruction

Describe therapeutic options for management of acute-colonic pseudo obstruction.

Self Assessment Questions:

Which of the following is a known adverse effect for neostigmine?

- A: Bradycardia
- B: Hemolytic anemia
- C: Hepatotoxicity
- D: Tachycardia

Neostigmine can recover gastric motility by?

- A: Delaying gastric emptying
- B: Inhibiting prostaglandins
- C: Increasing sympathetic activity
- D: Increasing parasympathetic activity

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-903L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

SCREENING FOR ATRIAL FIBRILLATION IN COMMUNITY PHARMACIES

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Purpose: To evaluate the feasibility and acceptability to patients, pharmacists and physicians of screening patients for atrial fibrillation (AF) in a community pharmacy using an FDA-approved handheld smartphone/iPad ECG. **Methods:** The protocol was approved by the Institutional Review Board in December 2016; data collection began January 2017. During the first phase, a convenience sample of patients ☐ 65 years of age (anticipated n=200) with no known history of AF presenting to a community pharmacy will be approached for AF screening. The screening will be performed using a handheld device that records an ECG by simple fingertip touch in 30-60 seconds and displays the ECG on a smartphone/iPad using a downloadable application. Patients will be given a result of "Normal" or "Possible AF", and their provider will be notified of the results. Participants with a reading of "Possible AF" will be referred to his or her physician for follow-up to ascertain whether a diagnosis of AF should be ascribed. The second phase will employ qualitative semi-structured interviews. Patients who complete the AF screening will be asked about his or her experience and attitudes regarding AF screening being offered in a community pharmacy. Questions to pharmacists will address attitudes regarding acceptability from pharmacists and patients, perceived benefits of the service, expected barriers to sustainability, and ways to improve the implementation process. Physicians will be asked about their perceptions regarding AF screening being performed in a community pharmacy. All interviews will be audio recorded and transcribed. Qualitative data will be collected and analyzed using qualitative data management software. **Results:** Pending. **Conclusions:** Early detection of AF via screening in community pharmacies has the potential to reduce the risk of stroke and systemic thromboembolism via facilitation of earlier anticoagulation. This study will determine the feasibility and acceptability of such an approach.

Learning Objectives:

Discuss the adverse effects associated with atrial fibrillation

Explain the potential role for community pharmacists in early-detection of atrial fibrillation

Self Assessment Questions:

People with atrial fibrillation are at an approximately 5-fold increase for?

- A: Heart failure
- B: Dementia
- C: Stroke
- D: Hyperlipidemia

What is the community pharmacist's role in screening for atrial fibrillation with a handheld ECG?

- A: Referring patients with possible atrial fibrillation to a provider
- B: Making a diagnosis of atrial fibrillation based on the ECG reading
- C: Prescribing oral anticoagulation medications
- D: Ordering a follow-up 12-lead ECG and blood work

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-743L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

CONTINUATION OF ANTIPSYCHOTICS INITIATED FOR ICU DELIRIUM: RECONCILIATION PRACTICES ACROSS TRANSITIONS OF CARE

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Purpose: Antipsychotics are frequently initiated in ICUs to treat acute psychosis, substance withdrawal, agitation, and delirium. One concern with initiating antipsychotics in the ICU to treat delirium is that the medication may not be discontinued at transitions of care once symptoms have resolved. The purpose of our study is to determine if antipsychotics initiated for the treatment of ICU delirium at the University of Chicago Medicine (UCM) are being appropriately discontinued at transitions of care. **Methods:** This study is a retrospective chart review of adult UCM patients that received antipsychotics for the treatment of delirium while in the ICU from March 2010 to December 2015. Use of the following antipsychotics were examined: quetiapine, olanzapine, haloperidol, and risperidone. Patients that were taking antipsychotics prior to admission, had a documented history of a psychiatric disorder, or expired during hospitalization will be excluded from our study. Our primary endpoint was the percentage of patients discharged home on antipsychotics that were initiated for the treatment of ICU delirium. Secondary endpoints examined the frequency of antipsychotic continuation when patients are transitioned from the ICU to a different unit within the hospital, quantity of antipsychotics received in the ICU, total days of antipsychotics received on ICU and non-ICU units, quantity of lorazepam equivalents received in the ICU, patient disposition, use of antipsychotic monotherapy vs combination therapy for the treatment of delirium in the ICU, number of patients on other QTc prolonging medications, whether or not an EKG was obtained within 30 days of initiating antipsychotics, and whether or not the patient received repeat EKGs during the course of treatment. Descriptive statistics will be used to analyze the results of our study. **Results/Conclusions:** Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify risk factors for ICU delirium

Describe guidelines recommendations for the treatment of ICU delirium

Self Assessment Questions:

Which of the following is an adverse effect associated with the use of atypical antipsychotics?

- A: QTc prolongation
- B: Gingival hyperplasia
- C: Nephrotoxicity
- D: Tachycardia

Which of the following methods can be used to reduce the incidence of delirium in an ICU patient?

- A: The use of benzodiazepines for sedation
- B: Allowing patients to sleep through the day
- C: Frequent reorientation
- D: Extend time patient spends in the ICU

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-535L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

UTILIZATION OF A STANDARDIZED PROCESS USING HEALTH REGISTRY DATA TO RECRUIT PATIENTS INTO CARDIOVASCULAR RISK REDUCTION CLINICS

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Background: Cardiovascular disease (CVD) is the leading cause of death worldwide and accounts for approximately 33% of all deaths in the United States (US). Modifiable risk factors for CVD include diabetes mellitus (DM), hypertension (HTN), hyperlipidemia (HLD), smoking, lack of physical activity, and obesity. With the present landscape of healthcare changing to put more emphasis on improving outcomes in the outpatient setting, preventing hospital admissions, and reducing total healthcare costs, greater integration of the pharmacist into the healthcare team and enhancing their scope of practice can have a significant impact on reducing cardiovascular risk. Many studies have demonstrated the efficacy of pharmacist intervention on individual CVD risk factors, but there is limited literature available supporting the role of pharmacists targeting multiple risk factors to reduce overall cardiovascular risk. More data is needed to support expansion of Cardiovascular Risk Reduction Clinics (CRRCs) in the ambulatory care setting. Additionally, there is limited data that describes an efficient way to enroll patients in these services. The purpose of this study is to evaluate a standardized method of recruiting patients using health registry data into Indiana University (IU) Health CRRCs. **Methods:** IU Health pharmacists began providing CRR services in early 2016. A new standardized enrollment approach using a patient health registry was implemented in July 2016 to recruit patients into IU Health CRRCs in order to supplement the previous recruitment method of physician referral. Data was prospectively collected for patients seen by a pharmacist for a Cardiovascular Risk Reduction appointment since August 1st 2016 and then retrospectively analyzed. Clinical outcomes evaluated were change in A1C, LDL, and BP, statin use, and tobacco cessation. Outcomes for patients enrolled through the new health registry process were compared to patients enrolled through physician referral. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the modifiable risk factors for cardiovascular disease.

Recognize the significant impact an ambulatory care pharmacist can have on reducing cardiovascular risk.

Self Assessment Questions:

Which is a modifiable risk factor for Cardiovascular Disease?

- A: Depression
- B: Hypothyroidism
- C: Hypertension
- D: Chronic Kidney Disease

Health Registries are online tools that:

- A: Offers unsecure portals for collecting or viewing patient registry info
- B: Enables the simultaneous collection of data from multiple sites and
- C: Gives providers the ability to see how their patients are meeting q
- D: B and C

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-636L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF AMBULATORY CARE PHARMACY SERVICES ON HUMAN IMMUNODEFICIENCY VIRUS (HIV) PATIENTS WITH CONCOMITANT DIABETES, HYPERTENSION, OR BOTH IN A SAFETY NET CLINIC

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Background: Human immunodeficiency virus (HIV) as well as antiretroviral therapy (ART) have been associated with increased blood pressure and metabolic effects such as impaired glucose tolerance, insulin resistance and hyperlipidemia. Previous studies have demonstrated reductions in blood pressure and A1c when ambulatory care pharmacy services are implemented. Additionally, utilization of HIV ambulatory care pharmacists significantly improve medication adherence leading to improved immunologic response and virological suppression. Limited studies have been published evaluating the impact of ambulatory care pharmacy services on the outcomes of diabetes mellitus (DM) and hypertension (HTN) in HIV patients. **Methods:** This study is a retrospective, non-randomized, non-blinded chart review of HIV positive patients with DM, HTN or DM/HTN from October 2014 to November 2016. There are two phases of the study pre- and post-implementation of ID ambulatory care pharmacy service Phase I (October 2014 to September 2015) and Phase II (October 2015 to November 2016). Adults > 18 years with a documented diagnosis of HIV and DM, HTN, or DM/HTN who received ≥ 3 active ART agents and were assessed at ≥ 2 clinic visits were included. The primary endpoint was the percentage of patients who achieved Hgb A1c and/or blood pressure goals before and after the implementation of ID ambulatory care pharmacy services. The secondary endpoints was the percentage of virologically suppressed patients who achieved Hgb A1c and/or blood pressure goals. **Results:** In phase I, 232 patients were evaluated. After exclusions, there were 8 DM, 19 HTN and 11 DM/HTN patients. In the DM group 37% of patients achieved goal A1c of < 7%, 53% of HTN patients achieved goal BP and 27% of patients with HTN/DM achieved both goal A1c and BP. Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize the role of an ID ambulatory care pharmacist on the maintenance of diabetes and hypertension in patients with HIV
Identify the impact of pharmacist interventions in a safety-net clinic

Self Assessment Questions:

Which class(es) of HIV medication most commonly induce metabolic syndrome

- A Non-nucleoside Reverse Transcriptase Inhibitors (NNRTIs)
- B: Protease Inhibitors (PI)
- C: Integrase Inhibitors
- D: Both A and B

What type of intervention does an ID ambulatory care pharmacist not make in a HIV clinic

- A New HIV medication counseling
- B Calling in Prescription to pharmacy
- C Delivery of medications
- D Drug-drug interaction identification

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-716L02-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF A MULTIDISCIPLINARY TRANSITIONS OF CARE SERVICE ON READMISSION RATES IN A GERIATRIC PATIENT-CENTERED MEDICAL HOME

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Purpose: The Turner Geriatric Clinic (TGC) is a patient-centered medical home (PCMH) at the University of Michigan Health System (UMHS) staffed by a multidisciplinary team including nurse navigators, clinical pharmacists, and board certified geriatric medicine physicians and nurse practitioners. This clinic provides a transitions of care (TOC) service aimed at improving patient outcomes for older adults recently discharged from the hospital setting. A previous study documented reduced readmission rates among patients who received the service. Since then, several processes and team composition have changed; this study aims to evaluate the effect of the current TOC service on readmission rates in the geriatric population. **Methods:** This is a single-center retrospective cohort study of adults age 60 years or older discharged from an inpatient stay at University of Michigan Hospital (UH). Discharges from inpatient, emergency department, observation, and short-stay units, between 7/1/2013 - 2/21/2016 are included in our study. Patients who received the TOC service at the TGC will be compared to patients who received standard care at other PCMH sites. Patients must have an established primary care provider (PCP), defined as a completed PCP visit within 2 years prior to the index hospitalization date. Patients will be excluded if they are discharged to sub-acute rehabilitation or nursing home facilities, or if they are admitted for a planned procedure. Based on the results of a previous iteration of this clinic model, we will need a population of 1120 patients for 90% power. All-cause 14, 30, and 90-day readmission rates between propensity score matched study groups will be evaluated by intention-to-treat, per protocol, and as-treated methods. Data will be analyzed using descriptive statistics, univariate, and multivariate analyses. The multivariate analyses will be performed by logistic regression and will also include a Cox proportional hazards survival regression on time to readmission. **Results/Conclusion:** In Progress

Learning Objectives:

Discuss the current literature related to transitions of care services and their impact on hospital readmission rates.

Describe potential improvements in care transitions in older adults.

Self Assessment Questions:

Based on current literature, approximately what percentage of Medicare beneficiaries are readmitted within 30 days of hospital discharge?

- A 10%
- B: 20%
- C: 30%
- D: 40%

In the TOC service at the UMHS TGC, pharmacists are primarily responsible for which of the following tasks?

- A Performing a modified geriatrics assessment
- B Assessing a patient's functional status, psychosocial issues, and I
- C Performing medication reconciliation and comprehensive medication
- D Formulating goals of care and coordinating appropriate follow-up

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-831L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF PEAK TOBRAMYCIN CONCENTRATIONS ASSOCIATED WITH AN INITIAL DOSE OF 3 MG/KG IN CRITICALLY ILL PATIENTS

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Purpose: Tobramycin is often used in critically ill patients as empiric coverage for gram negative pathogens. Bactericidal activity of tobramycin is optimized when peak concentrations reach 8-10 times the minimum inhibitory concentration (MIC). Critically ill patients often demonstrate altered pharmacokinetic parameters (e.g., renal clearance, volume of distribution) subjecting patients to increased risk of toxicity when conventional extended interval dosing strategies are used. Consequently, clinicians at University of Michigan utilize an empiric tobramycin dose of 3 mg/kg based on actual body weight to target peak concentrations of 8-10 mcg/mL. **Methods:** Retrospective, single center study of adult, critically ill medical and surgical patients receiving tobramycin therapy. Patients in whom two tobramycin serum concentrations were obtained after an initial dose of 3 (+ 0.3) mg/kg will be included. Measured serum concentrations will be used to determine elimination rate constant, volume of distribution and the peak concentration. Exclusion criteria include cystic fibrosis, greater than 20% body surface area burns, use of intermittent hemodialysis, initiation or cessation of continuous renal replacement therapy between the two tobramycin concentrations, and failure to obtain an initial tobramycin concentration within six hours following the dose. Patient demographics including age, weight, sex, and height will be collected. The primary outcome is percentage of patients achieving a goal tobramycin peak concentration of 8-12 mcg/mL. Secondary outcomes include identification of factors associated with tobramycin volumes of distribution ≥ 0.4 L/kg. Goal study enrollment is 250 patients. Statistical analysis will be conducted using descriptive statistics and Chi-Square test. **Results/Conclusions:** To be presented at 2017 Great Lakes Pharmacy Resident Conference

Learning Objectives:

Describe measured tobramycin pharmacokinetics in a large population of critically ill adult patients

Report factors that are associated with high volumes of distribution in critically ill adults

Self Assessment Questions:

The bactericidal activity of tobramycin has been reported to be optimized when which of the following parameters is reached

- A: Trough concentrations that are at least 2 times the minimum inhibitory concentration
- B: Peak concentration of 8-10 times the MIC of pathogens
- C: Peak concentration that is 4-5 times the MIC of pathogens
- D: Peak concentrations that are 2-3 times the MIC of pathogens

The results of this study are not applicable to patients in which of the following populations:

- A: Patients greater than 65 years old
- B: Patients with sepsis and septic shock
- C: Cystic Fibrosis
- D: A and B

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-495L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF EXENATIDE ER ON HEMOGLOBIN A1C, WEIGHT, AND TOTAL DAILY DOSE OF INSULIN IN PATIENTS WITH TYPE 2 DIABETES MELLITUS USING U-500 INSULIN

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Statement of the Purpose: Use of GLP-1 agonists in combination with basal insulin is used in clinical practice; however, its use with U-500 insulin is not currently approved by the Food and Drug Administration. The primary objective will evaluate change in hemoglobin A1C over 24 months after addition of exenatide extended-release (ER) to U-500 insulin in Veterans Affairs (VA) patients. The secondary objectives will assess the change in weight, total daily dose (TDD) of insulin, and reports of hypoglycemia from baseline to 24 months after the addition of exenatide ER. **Statement of Methods Used:** This study was approved by the Institutional Review Board. This is a retrospective chart review of outpatients enrolled in a VA clinic. Patients will be identified through the Computerized Patient Record System and will be eligible if they have concomitant prescriptions for regular U-500 insulin and exenatide ER. The following data will be collected: patient gender, age, race/ethnicity, weight, body mass index, hemoglobin A1C, TDD of insulin, hypoglycemic episodes, concomitant diabetes medications, and years since diagnosis of type 2 diabetes. Data will be de-identified to protect patient confidentiality. For the primary outcome, the mean A1C at baseline, 3, 6, 12, 18, and 24 months will be evaluated. For secondary outcomes, the mean weight and TDD of insulin at baseline, 3, 6, 12, 18, and 24 months will be evaluated. Any reports of hypoglycemia will also be recorded. Repeated measures ANOVA will be performed on the primary and secondary outcomes to assess the differences in mean scores over six time periods. **Summary of Results to support conclusion:** N/A **Conclusions Reached:** N/A

Learning Objectives:

Explain the impact of GLP-1 receptor agonists on hemoglobin A1C, weight, and total daily dose of insulin in patients with type 2 diabetes mellitus using U-500 insulin.

Identify patients that would potentially benefit from the combination of U-500 insulin and a GLP-1 receptor agonist.

Self Assessment Questions:

Adding a GLP-1 agonist to U-500 insulin in a patient with type 2 diabetes may have which of the following benefits:

- A: Decrease hemoglobin A1c
- B: Increase the patient's total daily insulin dose
- C: Weight loss
- D: A and C

Which of the following patients would potentially benefit most from the addition of a GLP-1 agonist?

- A: 58 YO male with an A1C of 6.7% who is stable on his current dose
- B: 70 YO male with an A1C of 8% who is in the middle of titrating his
- C: 64 YO male with an A1C of 9% on U-500 (350 units per day) and I
- D: 57 YO male with an A1C of 6.4% who is stable on his current dose

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-621L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IDENTIFYING RISK FACTORS FOR MRSA PNEUMONIA IN SURGICAL ICU PATIENTS WITH VENTILATOR-ASSOCIATED PNEUMONIA

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Background/Purpose: Methicillin-resistant staphylococcus aureus (MRSA) has become increasingly prevalent as a causative pathogen for pneumonia in the critically ill population. Without recognized risk factors for MRSA it is challenging to identify patients appropriate for empiric MRSA coverage, often resulting in missing patients at risk or overuse of broad spectrum antibiotics. The primary objective of this study is to identify the incidence of and risk factors for MRSA ventilator-associated pneumonia (VAP) in surgical intensive care unit (SICU) patients. **Methods:** This is a single-center, retrospective risk factor analysis of adult SICU patients diagnosed with VAP between January 1, 2013 and August 31, 2016. Patients diagnosed with VAP during SICU admission will be eligible for inclusion. VAP will be defined as a positive lower respiratory culture (bronchoscopic bronchial alveolar lavage (BAL) or mini-BAL) collected >48 hours after endotracheal intubation. Patients with MRSA VAP, defined by isolation of MRSA from a lower respiratory culture at any point during SICU admission, will be included in the MRSA VAP group. Patients without MRSA isolated from any lower respiratory cultures will be included in the Non-MRSA VAP group.

The primary outcome is the incidence of MRSA VAP compared to non-MRSA VAP. Secondary outcomes include risk factors associated with MRSA VAP, duration of mechanical ventilation, hospital and ICU length of stay, and mortality. Data collected will include patient demographic information, past medical history and relevant comorbidities, clinical characteristics both upon admission and at the time of VAP diagnosis, exposure to antibiotics prior to diagnosis, and duration of antibiotic exposure. **Results/Conclusions:** Identification of risk factors for MRSA VAP could aid in the selection of patients appropriate for empiric antibiotic therapy against MRSA and minimize unnecessary use of these agents in patients without risk factors. The final results will be presented

Learning Objectives:

Identify known risk factors for multi-drug resistant (MDR) ventilator-associated pneumonia (VAP) as outlined in the literature
Discuss available literature describing risk factors for MRSA VAP in a surgical intensive care unit (SICU) population

Self Assessment Questions:

Which of the following is a known risk factor for multi-drug resistant (MDR) ventilator-associated pneumonia (VAP)?

- A: Prior IV antibiotic use within 90 days
- B: Immunosuppression
- C: ARDS preceding VAP
- D: Both A and C

Which of the following are limitations of the available literature describing risk factors for MRSA VAP in a surgical intensive care unit (SICU) population?

- A: Only one study specific to a SICU population
- B: Small patient cohorts
- C: Risk factors examined are likely incomplete
- D: All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-567L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF AN IN-LAB HONOR CODE STATEMENT ON PHARMACY STUDENTS ACADEMIC HONESTY

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Purpose: Academic dishonesty continues to be a concern at all levels of academia. A survey conducted by the International Center for Academic Integrity (ICAI) reported that the number of undergraduate and graduate students admitting to cheating on written assignments or tests resulted in 68% and 43% of respondents, respectively. The objective of this study was to assess the impact of an in-lab honor code statement on third-year pharmacy students' perceptions and attitudes towards academic honesty. **Methods:** At the Purdue University College of Pharmacy, each class of students (N=150) are divided into smaller groups (N=32) to participate in the professional skills laboratory. Students participate in one laboratory per week, so the activities performed in the Monday laboratory are the same for the Friday laboratory. Students with laboratories earlier in the week may discuss activities with peers with laboratories later in the week, creating inequities in the laboratory experience. For this study, 150 third-year pharmacy students were issued an Honor Code Statement (HCS) as part of their laboratory grade. A subsequent anonymous 18-question survey was distributed by an independent third party to the pharmacy students, with a group incentive offered if at least 80% responded to the survey. The survey items focused on their current behaviors and attitudes toward academic dishonesty and the influence of the HCS on their behaviors. Descriptive statistics and nonparametric statistical tests were performed.

Results: The HCS was completed by 100% of students. Approximately 67% of the class responded to a follow-up survey on the impact of the HCS. There were statistically significant differences when evaluating the impact of the HCS in regards to discussion behavior with classmates and the resulting consequences of breaking the HCS. **Conclusion:** Results suggest that HCS can positively influence students' understanding of and behaviors regarding academic dishonesty.

Learning Objectives:

Identify areas in a curriculum to address academic honesty.
Describe an academic honesty system (or HCS) to reduce dishonesty and enhance student knowledge.

Self Assessment Questions:

This study demonstrated the benefits of an honor code statement in which type of teaching format?

- A: Pharmacology development
- B: Standard classroom instruction/Therapeutics
- C: Professional skills lab
- D: Experiential activity

Approaches to prevent academic dishonesty include:

- A: Formalized honor code system
- B: Highlighted policy in a syllabus
- C: Defined ethics committee
- D: All of the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-723L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF CLINICAL PHARMACIST SERVICES IN A TRANSITIONS OF CARE PROGRAM PROVIDED TO HIGH-RISK PATIENTS

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Purpose: Hospital readmissions are costly and can have detrimental effects on both patients and their families. To prevent hospital readmissions, eligible patients were scheduled for a post-discharge transition of care (TOC) comprehensive medication review (CMR) by ambulatory care pharmacists. The objectives of this study are: to examine 30-day hospital readmission rates, to describe the ambulatory care pharmacist-recommended interventions, and to quantify the acceptance rate of these interventions by primary care providers (PCP) in patients who participated in a CMR with an ambulatory care pharmacist. **Methods:** A multidisciplinary TOC program was implemented in February 2016 with aims to improve transitions of care following hospitalization. In the ambulatory setting, these interventions include a nurse navigator phone call, pharmacist CMR via telephone, and post-discharge PCP follow-up visit. Eligible patients were identified using the validated LACE risk stratification tool, which prospectively identifies patients at risk for readmission or death within 30 days of discharge. The ambulatory care pharmacist service was available to University of Michigan Health System (UMHS) highest-risk (LACE score ≥ 13) patients discharged from select inpatient services. Of the eligible patients, approximately half were scheduled for the CMR service. During their phone call, pharmacists reviewed medications, reconciled current medications against those prescribed prior to admission and at hospital discharge, identified drug therapy problems, and documented recommendations for the providers review at the follow-up visit. Readmission rates between the group that received the pharmacist CMR service and the group that was not scheduled to receive the service will be compared. This study is approved by the UMHS Institutional Review Board. All data, including demographics, readmissions information, recommended interventions and acceptance rates will be collected via retrospective chart review. Descriptive statistics and multivariable analyses will be utilized. **Results and Conclusions:** To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain the importance of transitions of care services

Describe the LACE transition of care initiative implemented at the University of Michigan Health System

Self Assessment Questions:

Which of the following provides the best description of the goal(s) associated with transition of care (TOC) services overall?

- A To prevent patients from being admitted for routine surgeries
- B To reduce healthcare costs, avoid potential adverse events, and p
- C To reduce the number of transitions between settings of care
- D To counsel patients on benefits and risks associated with their me

Which of the following best describes the components associated with the University of Michigan Health System LACE initiative in the ambulatory setting?

- A PharmD follow-up visit and referrals to new providers
- B Inpatient Care Manager evaluation and pre-discharge medication i
- C Patient and family education
- D Care Navigator call, PharmD call, and primary care follow-up visit

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-732L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

INCIDENCE OF HYPERSENSITIVITY REACTIONS AND MAJOR ADVERSE DRUG REACTIONS IN PEDIATRIC AND ADOLESCENT AND YOUNG ADULT ACUTE LYMPHOBLASTIC LEUKEMIA PATIENTS RECEIVING INTRAVENOUS VERSUS INTRAMUSCULAR PE

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Purpose: Pegaspargase plays a critical role in acute lymphoblastic leukemia therapy in children as well as adolescent/young adult patients. One of the more concerning adverse effects observed with pegaspargase use is severe, dose-limiting hypersensitivity reactions. Pegaspargase is approved for intravenous (IV) or intramuscular (IM) administration. There have been recent studies conducted at children's hospitals suggesting that the pegaspargase administered by IV route may result in more hypersensitivity reactions than when administered by the IM route. The purpose of our study is to evaluate the rate of hypersensitivity reactions in pediatric and adolescent/young adult patients receiving intramuscular versus intravenous pegaspargase at the University of Chicago Medicine. Our secondary objective is to evaluate the rate of major adverse drug reactions not caused by hypersensitivity between the two routes of administration. We hypothesize that hypersensitivity reactions will be observed more frequently with the IV route and that other major adverse reactions occur more frequently in the adolescent/young adult population regardless of route of administration. **Methods:** Through a retrospective chart review of patients that received either IV or IM pegaspargase between June 2008 and October 2016, data to be evaluated will include patient characteristics, pegaspargase route of administration, and incidence of hypersensitivity as well as major adverse reactions, to include hepatotoxicity, pancreatitis, and coagulation abnormalities. Utilizing descriptive statistics as well as chi squared and Wilcoxon rank sum tests, we wish to confirm or refute the findings of previous studies when applied to the population at the University of Chicago Medicine Comer Childrens Hospital. Data collection is currently in progress and results will be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the role of pegaspargase in the treatment of pediatric/AYA acute lymphoblastic leukemia

Identify the route of pegaspargase with the most described incidence of hypersensitivity reactions

Self Assessment Questions:

What is the benefit of using the pegylated formulation of asparaginase?

- A Pegylated formulation reduces immune response
- B: Pegylated asparaginase is more cost effective
- C: Higher cure rate using the pegylated formulation
- D: There is no benefit between pegylated and non-pegylated asparag

What was the rate of hypersensitivity reactions found by Peterson and colleagues when pegaspargase was administered intravenously?

- A 12%
- B 19.5%
- C 25%
- D 29.5%

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-709L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ASSESSING THE IMPACT OF A PHARMACIST ON THE CENTER FOR MEDICARE AND MEDICAID SERVICES STAR RATINGS IN A PATIENT-CENTERED MEDICAL HOME

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Purpose: The patient-centered medical home (PCMH) facilitates comprehensive and coordinated care through continuous, interdisciplinary services that actively involve patients and their caregivers. The Center for Medicare and Medicaid Services (CMS) created the Star Ratings program to meet the Affordable Care Act requirement for transparent, easily-understood, public reporting of quality of care information and to assist consumers in making informed decisions. Medicare Advantage and Part D plans receive CMS Star Ratings based on quality measures. These plans may participate in a shared savings agreement with PCMHs, in which the CMS Star Ratings are used to determine reimbursement. Pharmacists are well versed in therapeutic management which makes them uniquely qualified to participate in medication therapy management in a PCMH. Pharmacists have the ability to improve quality measures, particularly those directly related to medications. The purpose of this study is to assess the impact of a pharmacist integrated into a level three PCMH on specific CMS Star Ratings. **Methods:** This study is a retrospective chart review of patients who met with the pharmacist at the Norton Audubon East Lowe Level 2 PCMH from August 3, 2016 - December 28, 2016. Patients were included if they were 18 years of age or older, had a visit with their primary care provider in the previous two years, and have a diagnosis of diabetes. The primary objectives include comparing the following CMS Star Ratings before and after pharmacist intervention: Diabetes Care - Blood Sugar Controlled, Diabetes Care - Kidney Disease Monitoring, Diabetes Care - Eye Exam. The secondary objective evaluates the number and type of accepted and rejected interventions made to the patients primary care physician. **Results/Conclusion:** Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the purpose of the CMS Star Ratings program.

Recognize the CMS Star Ratings which may be impacted by a pharmacist.

Self Assessment Questions:

Which of the following is the purpose of the CMS Star Ratings program?

- A: Diminish transparency of quality of care information
- B: Reduce plan-provider gain-sharing incentives
- C: Assist consumers in making informed decisions
- D: Dissuade improvements in the quality of care provided

The following are CMS Star Ratings potentially impacted by the integration of a pharmacist into the PCMH except:

- A: Comprehensive Diabetes Care – Blood Sugar Controlled
- B: Breast Cancer Screening
- C: Care for Older Adults – Medication Review
- D: Medication Adherence for Oral Diabetes Medications

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-583L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

OBTAINING URAC SPECIALTY PHARMACY ACCREDITATION AND STAFF IMPRESSION OF PATIENT CARE IMPACT

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Background: Hackley Professional Pharmacy (HPP) is an outpatient specialty pharmacy that provides medications for patients with HIV, Hepatitis C, and other conditions. HPP is located within a community hospital, Mercy Health Muskegon Hackley Campus, which also houses a hepatitis C and HIV clinic. HPP has applied for specialty pharmacy accreditation through the URAC organization in order to better serve patients taking specialty medications in the Western Michigan community. Being compliant with URAC standards and core measures serves as proof that a specialty pharmacy is committed to improving patient outcomes. In addition, certain pharmacy benefit managers require URAC accreditation in order to be compensated for services. A URAC accredited pharmacy must demonstrate the ability to; improve patient outcomes based on pharmacy processes and protocols, access electronic health records and laboratory data, and make appropriate interventions based on the individual clinical situation. URAC accreditation consists of an electronic desktop review and an onsite visit to ensure that the standards and core measures have been met.

Purpose: To become accredited as a specialty pharmacy to address the needs of patients in the community by providing higher quality healthcare. Data from this project will be used as part of a continual process improvement to ensure that patient needs and expectations are being met by the specialty pharmacy.

Methods: HPP has submitted for URAC accreditation. At the time of abstract submission, desktop review is scheduled for February of 2017, followed by onsite review in April of 2017. At that time, URAC will determine pharmacy compliance with the accreditation standards. The primary outcome will be HPP's percent-compliance to URAC standards based on the desktop review. The secondary outcome will be staff impression of patient care following URAC policy and procedure implementation. Survey data will be analyzed retrospectively.

Results: Pending

Conclusion: Pending

Learning Objectives:

Recognize the potential benefits of a specialty pharmacy being accredited by URAC

Recognize the impact of URAC accreditation on patient satisfaction

Self Assessment Questions:

Which of the following is a potential benefit of a specialty pharmacy becoming URAC accredited?

- A: Increased level of healthcare provided to patients due to processes
- B: Discount prices for patients
- C: More time required on tasks from each member of the pharmacy staff
- D: Higher volume of prescriptions filled

What is a positive impact that patients may experience after a pharmacy is URAC accredited?

- A: Less wait time
- B: Prescription drug payment plan through the pharmacy
- C: Increased accessibility to speak with a member for the specialty pharmacy
- D: Prescription drug discounts

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

RATES OF NEUTROPENIA IN KIDNEY TRANSPLANT RECIPIENTS BASED ON INDUCTION AGENT

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PURPOSE: Neutropenia is a common but poorly defined complication post renal transplantation. Incidence of neutropenia in this population has been reported between 4.9% and 37.5% and occurrence can have negative consequences, including opportunistic infections. Alemtuzumab, a CD52 monoclonal antibody, and basiliximab, a CD25 monoclonal antibody, are the two agents primarily used for induction at Northwestern Memorial Hospital. Severe neutropenia is a well-documented side effect of alemtuzumab and previous trials have shown basiliximab to be associated with varying degrees of neutropenia as well. The purpose of this study is to compare one-year incidence and severity of neutropenia in kidney transplant recipients based on induction agent of alemtuzumab or basiliximab. **METHODS:** This will be a retrospective cohort study of patients who received a kidney transplant at Northwestern Memorial Hospital. Study period will be from January 1, 2010 to January 1, 2016. The patients will be divided into two groups based on induction agent used prior to transplantation. Patients will be excluded if they received a prior transplant, have a history of cancer treated with chemotherapy, received rituximab desensitization, or are enrolled in a clinical trial. Data collected will include general demographic information; baseline white blood cell and absolute neutrophil counts; incidence of neutropenia or leukopenia; donor/recipient CMV serology; immunosuppression and prophylaxis medication regimen; immunosuppression drug levels; rates of febrile neutropenia and CMV infection; administration of growth factors; and incidence and treatment of rejection. The primary outcome will be the incidence of neutropenia. Secondary outcomes will include the degree of neutropenia and the rates of leukopenia, febrile neutropenia, CMV infection and rejection. **RESULTS/CONCLUSION:** Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss neutropenia as a significant adverse effect after kidney transplantation.

Define the risks associated with alemtuzumab induction compared to basiliximab induction.

Self Assessment Questions:

Which of the following can be used to prevent rejection in kidney transplant patients?

- A Alemtuzumab
- B Sulfamethoxazole-trimethoprim
- C Valganciclovir
- D Fluconazole

What of the following statements is true?

- A Alemtuzumab is a CD25/IL-2 monoclonal antibody.
- B Basiliximab is a CD52 monoclonal antibody.
- C Alemtuzumab is FDA-approved for induction prior to kidney transplant.
- D Basiliximab is FDA-approved for induction prior to kidney transplant.

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-507L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF PATIENTS WITH AN A1C GREATER THAN OR EQUAL TO 8% WHO ARE NOT PRESCRIBED METFORMIN IN MEDICAL RESIDENT OUTPATIENT CLINICS

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Fitzpatrick, SE. Morrical-Kline, K. Evaluation of patients with an A1C greater than or equal to 8% who are not prescribed metformin in medical resident outpatient clinics. **Statement of Purpose:** Metformin is a cornerstone of therapy for the treatment of Type 2 Diabetes Mellitus (T2DM). Both the American Diabetes Association (ADA) Standards of Medical Care in Diabetes 2016 guidelines and American Association of Clinical Endocrinologists and American College of Endocrinology (AAACE/ACE) recognize metformin as a first-line agent to treat T2DM due to its cardiovascular benefits, 1-2 point reduction in hemoglobin A1C, and low risk of hypoglycemia and weight gain. The purpose of this quality improvement project was to evaluate the patients with an A1C $\geq 8\%$ who are not currently prescribed metformin at the St. Vincent Joshua Max Simon Primary Care Centers Internal Medicine and Family Medicine clinics. **Statement of Methods Used:** This retrospective quality improvement project identified patients using a query from electronic health records between the dates of April 1, 2015 through March 31, 2016. Adult, non-pregnant, patients with a diagnosis of T2DM and a hemoglobin A1C $\geq 8\%$ who were not prescribed metformin for at least one encounter during the query period were included in this study. Descriptive statistics were used to evaluate the outcomes. The primary objective was to determine the percentage of patients with T2DM who have an A1C $\geq 8\%$ that are not currently prescribed metformin. The secondary objectives were to describe the characteristics of patients with T2DM who have an A1C $\geq 8\%$ that are not prescribed metformin during the study period. **Summary of Preliminary Results:** Data analysis in progress. **Conclusions Reached:** Conclusions will be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss Type 2 Diabetes Mellitus treatment guidelines

Review the new United States Food and Drug Administration (FDA) metformin renal dose adjustment guidelines

Self Assessment Questions:

Which patient would not be appropriate for metformin therapy based on the new FDA renal dose adjustment guidelines?

- A 50 year old male with chronic T2DM and chronic kidney disease (CKD)
- B 40 year old female with CKD stage 4 with a new diagnosis of T2DM
- C 75 year old female with chronic T2DM and a eGFR of 60mL/min
- D 25 year old male with new diagnosis of T2DM with an eGFR of 90

Which agent is a first line agent recommended by the ADA Standards of Medical Care in Diabetes 2016 and AAACE/ACE guidelines?

- A Metformin
- B Sitagliptin
- C Pioglitazone
- D Glipizide

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-446L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF PROCALCITONIN ON ANTIBIOTIC EXPOSURE, HOSPITAL LENGTH OF STAY, AND 30-DAY READMISSION RATE IN PATIENTS WITH A CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) EXACERBATION

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Objective: The unnecessary use of antibiotics in COPD exacerbations increases healthcare costs, promotes bacterial resistance, and causes avoidable adverse effects. Previous studies show that procalcitonin-guided therapy greatly reduces antibiotic exposure.

Learning Objectives:

Explain the role of procalcitonin use in patients with a lower respiratory tract infection.

Discuss the rationale behind using procalcitonin in patients with a COPD exacerbation.

Self Assessment Questions:

Which of the following statements is true regarding procalcitonin?

- A: Procalcitonin rises significantly with viral and/or non-infectious inflammation
- B: Procalcitonin levels remain elevated for up to 72 hours after eradication of infection
- C: Procalcitonin levels may be useful to distinguish bacterial infection from viral infection
- D: Procalcitonin is a direct correlation to white blood cell (WBC) count

Which of the following is the most common trigger of COPD exacerbations?

- A: Viral infections
- B: Bacterial infections
- C: Pollution
- D: Ambient temperatures

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-974L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS RESISTANCE RATES TO CEFTAROLINE FOSAMIL IN PATIENTS WITH ELEVATED MINIMUM-INHIBITORY CONCENTRATIONS TO VANCOMYCIN

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The use of vancomycin (VAN) to treat methicillin-resistant *Staphylococcus aureus* (MRSA) infections when the MIC is 1.5 g/mL or greater has been associated with poor outcomes and the ideal antibiotic in this setting has not been established. Ceftaroline fosamil (CPT) is an appealing treatment option due to established dosing regimens, favorable side-effect profile, and activity against *Staphylococcus aureus*. In addition, given the in vitro susceptibility of CPT being 97% in published literature, it may easily be assumed that it is a reliable treatment option for patients with an elevated MIC to VAN without the need for susceptibility testing. This prescribing pattern was seen at Cabell Huntington Hospital (CHH) where CPT susceptibilities are not routinely tested. The primary outcome of this study is to examine MRSA susceptibility rates to CPT in isolates with a VAN MIC of 2 g/mL as determined by MicroScan. A secondary outcome will be a comparison of VAN MICs reported via MicroScan versus VAN MICs identified by E-test. **Methods:** This study is a retrospective, electronic chart review of patients at CHH with MRSA infections from isolates reported to have elevated MICs to VAN between January 1, 2015 and February 1, 2017. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Report the resistance rates of MRSA to ceftaroline fosamil in patients with a vancomycin MIC of 2 as determined by MicroScan at Cabell Huntington Hospital

Discuss the potential implications of using ceftaroline fosamil without determining resistance rates in MRSA infections

Self Assessment Questions:

Which of the following are approved indications for the use of ceftaroline fosamil?

- A: Acute bacterial skin and skin structure infections and community-acquired pneumonia
- B: Complicated bacterial skin and skin structure infections and hospital-acquired pneumonia
- C: Acute bacterial skin and skin structure infections and hospital-acquired pneumonia
- D: Complicated bacterial skin and skin structure infections and hospital-acquired pneumonia

Which of the following is true regarding use of ceftaroline fosamil?

- A: It can be dosed as once a day
- B: Prolonged use has been associated with agranulocytosis and leukopenia
- C: Dosing adjustment is not required in patients with moderate-to-severe renal impairment
- D: It is a fourth generation cephalosporin

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-662L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IDENTIFYING MODIFIABLE PREDICTORS OF MORTALITY IN CARBAPENEM NON-SUSCEPTIBLE (CARB-NS) PSEUDOMONAS AERUGINOSA AND ENTEROBACTERIACEAE INFECTIONS

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Purpose: The emergence of carbapenem resistant organisms (CRO) including *Pseudomonas aeruginosa* and carbapenem-resistant *Enterobacteriaceae* (CRE) without a significant number of new antibiotics developed to treat these infections has led to many concerns. Depending on the organism and source of infection, mortality rates reported range from 20-40%. The objective of this study was to identify modifiable predictors of mortality to improve the treatment of carbapenem non-susceptible *Pseudomonas aeruginosa* (*P. aeruginosa*) and *Enterobacteriaceae* infections. **Methods:** This IRB approved, retrospective case-control study was conducted at a four hospital health system in southeast Detroit. All clinically infected patients ≥ 18 years of age with a carbapenem non-susceptible organism identified from November 2013 to October 2015 were screened for inclusion. Patients were excluded if they met any of the following criteria: urinary source of infection, cultures collected at an outside hospital, or hospice designation within 24 hours of pathogen directed therapy. The primary outcome of interest was in-hospital mortality. Descriptive statistics and bivariate analyses will be used to describe patient characteristics and compare variables. Multivariable logistic regression will be performed to identify independent predictors of mortality, with pharmacodynamic (PD) optimization of beta-lactam therapy as the main exposure of interest. Blinded adjudication will be used to determine PD optimized beta-lactam. A receiver operator curve will be utilized to validate associations of mortality that were identified from logistic regression. **Results and Conclusions:** Results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Identify potential risk factors for mortality in patients with carbapenem non-susceptible infections

Recognize an optimal regimen for a patient with a carbapenem non-susceptible infection

Self Assessment Questions:

Which of the following factors may contribute to higher mortality rates in patients with carbapenem non-susceptible infections?

- A: Combination therapy
- B: Lack of source control
- C: Pharmacodynamically optimized beta-lactam therapy
- D: Triple drug therapy

MV is a 43 yo female with positive *Klebsiella pneumoniae* blood culture. The meropenem MIC was 8 mcg/mL and she has normal renal function. Which of the following would be a pharmacodynamically optimize

- A: Meropenem 2 g IV Q8h extended infusion over 3 hours
- B: Meropenem 500 mg IV Q6h
- C: Ciprofloxacin 400 mg IV Q24h
- D: Vancomycin pharmacy to dose

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-404L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

CENTRALIZATION OF WORKFLOW IN THE ONCOLOGY PHARMACY SERVICES

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Purpose: Aurora Health Care has 22 oncology clinics and 16 hospitals across Eastern Wisconsin but each site does not have an oncology trained pharmacist on site and therefore all patients do not receive all eligible services. In 2014, AHC implemented a centralized order verification (COV) model where centrally located pharmacists evaluated the appropriateness of orders. Results from this model showed the site pharmacists time to complete clinical activities had increased 2-fold. The results from this centralized model sparked interest in evaluating other roles or services that may be completed by a centralized pharmacist. Also, in an effort to promote continuity of care in oncology patients per the Pharmacy Practice Model Initiative, a new service was identified involving chart reviews completed by oncology trained pharmacists of newly admitted inpatients across the system with active chemotherapy treatment. The purpose of this project is to implement centralization of designated services to ensure consistent quality care to our oncology patients. **Methods:** Prior to designing a centralized workflow, an evaluation of tasks at multiple sites was completed. This was accomplished via surveys sent to all inpatient and outpatient pharmacists across the system and creating a master list to determine what sites may or may not complete specific tasks. The master list was utilized to identify major services that the centralized pharmacist role would complete: cycle 1 day 1 pre-treatment assessment, supportive care counseling, follow-up phone calls, drug information questions and the review of newly admitted oncology patients by an oncology pharmacist. On September 12th, 2016 a centralized pharmacist role was implemented using remote camera technology. Primary outcomes include percentage of patients captured receiving these services and time site-based pharmacist saved after implementation. **Results/Conclusion:** Data collection is currently pending and results will be presented at the Great Lakes Conference.

Learning Objectives:

Discuss the purpose of implementing a centralized oncology workflow. Identify potential barriers and how to overcome them when implementing a centralized workflow.

Self Assessment Questions:

Which of the following is a Pharmacy Practice Model Initiative?

- A: Work independently of other healthcare members
- B: Provide continuity of care
- C: Diminish the role of specialists
- D: Pharmacists should provide drug therapy management to inpatient

What are benefits of implementing a centralized workflow?

- A: Ability to capture more eligible patients
- B: Standardization of workflow
- C: Less overall tasks for the site pharmacist to complete
- D: Answers A & B

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-805L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF VANCOMYCIN RESISTANT ENTEROCOCCUS (VRE) COLONIZATION AND INFECTION RATES IN ADULT LIVER TRANSPLANT PATIENTS

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Background: VRE infections are associated with higher morbidity and mortality among patients undergoing liver transplantation. Objective: The primary outcomes are to look at VRE infection rate post-transplant and risk factors associated with VRE infection. The secondary outcome is to determine baseline VRE colonization rates in our patient population prior to transplant. Methods: Adult patients undergoing liver transplantation between 1/1/2013 and 6/30/2016 were included. VRE rectal swabs were obtained per protocol on waitlisted liver transplant patients established in November 2014. VRE infection was identified through labs and verified with chart review. Cox Proportional Hazards Model was used to identify predictors of VRE infection post-transplant. Competing Risk analysis was used to calculate VRE infection rates. Results: Between 1/1/2013 and 6/30/2016, 127 patients underwent liver transplant. The mean age was 57.3 +/- 9.4, 64% were male, 32% received DCD organs, and 21% were liver-kidney transplants. The mean MELD was 29 +/- 8.5 with 46% having a MELD \geq 31. 62 (49%) had VRE rectal swabs performed. Of those with a swab, 23 (37%) were colonized. VRE infection rates were 6.3%, 15.7%, and 17.4% at 1, 3, and 6 months post-transplant, respectively. Female gender (HR=2.37 (1.06-5.28), p=0.04), MELD \geq 31 (HR=2.58 (1.10-6.02), p=0.03), longer post-transplant length of stay (LOS) (HR per 7 day increase=1.10 (1.02-1.19), p=0.01), and having been exposed to meropenem prior to transplant (HR=3.45 (1.28-9.29), p=0.01) were significantly associated with increased risk of VRE infection. VRE colonization was not significantly associated with VRE infection (HR=1.27 (0.40-4.02), p=0.68). Conclusions: VRE colonization was not significantly associated with VRE infection post-transplant in this patient group. However, a low volume of patients where colonization can be determined could be a limiting factor. Gender, MELD, longer LOS, and meropenem were associated with VRE infection in univariate models and LOS and meropenem were independent predictors.

Learning Objectives:

Identify risk factors for VRE infection in the liver transplant population.
Review procedures to decrease the spread of VRE colonization and infection.

Self Assessment Questions:

Which of the following are potential ways to decrease the spread of VRE colonization and infection in the acute setting?

- A: Strict hand hygiene protocols
- B: Routine VRE screening in high risk patients
- C: Isolating VRE colonized patients
- D: All of the above

Which of the following were factors were associated with post-transplant VRE infections at Aurora?

- A: VRE colonization
- B: Previous vancomycin use
- C: Previous meropenem use
- D: Previous proton pump inhibitor use

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-333L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ESTABLISHING PHARMACIST INVOLVEMENT IN AURORA BAYCARE MEDICAL CENTER CARDIOLOGY CLINIC

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Purpose: Patients referred to the cardiology clinic are often of advanced age, have multiple comorbidities, have difficulty with their medication regimens, and are noncompliant. Medication noncompliance and adverse medication events play a significant role in the risk for hospital readmissions. Pharmacists can help to optimize medication therapy and educate patients to increase medication compliance. The objective of this project was to pilot a clinical pharmacy service in a hospital-based cardiology clinic. Methods: To integrate the pharmacist into the cardiology clinic workflow, the initial step was to observe current workflow at both the involved clinic site and also at an advanced heart failure clinic within the same health care organization, in which pharmacists have established a full-time presence. Initially, frequency of these services was for the pharmacists to be present on a full clinic day every other week, to coincide with the clinic's effort to schedule heart failure and transitional care visits with a cardiology physician assistant. This pilot began October 12th, 2016 and is planned to continue through April 2017. Starting in January, a pharmacy resident also began working in the clinic one-half day per week. The pharmacists perform comprehensive medical profile reviews prior to the visit, make recommendations to the physician assistant for optimizing medication regimens, and during the patient visit are responsible for assessing patient-reported medication adherence and providing patient counseling. Pharmacists will document the number, type and frequency of interventions, pharmacist time spent with each patient, and will enter a progress note in the electronic medical record to document the purpose of the patient interaction, information discussed, and any recommendations for drug therapy changes. The cardiology clinic staff will be surveyed to assess pharmacist services near completion of this pilot. Results/Conclusion: Data collection is in progress and results will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Identify three reasons why pharmacist involvement in a cardiology clinic may be beneficial for patient outcomes

Recognize known risk factors for hospital readmission following discharge from an inpatient stay

Self Assessment Questions:

Which of the following benefits of pharmacist involvement in a cardiology clinic have been demonstrated?

- A: Reduced medication errors
- B: Improved survival
- C: Decreased adverse drug reactions
- D: All of the above

What are risk factors that may increase the likelihood of readmission?

- A: Medication noncompliance
- B: Adverse effects
- C: Medication education
- D: A & B

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-753L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ASSESSING THE ROLE OF THE PHARMACIST IN THE NEUROLOGY CLINIC

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Purpose: Medications prescribed for chronic neurological conditions are often high cost, require intense laboratory monitoring, and frequently have low adherence rates. Due to the complexity of patient management, an interdisciplinary approach is essential. Froedtert & the Medical College of Wisconsin recognized the potential benefit and recently hired a dedicated neurology clinic pharmacist. The primary objective of this project was to assess the pharmacy services neurology clinic providers utilized and the subsequent benefit to both the patients and the organization. Secondary objectives of this project were to assess the impact a pharmacist has on prescription capture rates and provider satisfaction within the neurology clinic. **Methods:** In order to gain provider buy-in and solicit feedback on the role of the pharmacist, discussions were held with various stakeholders of the neurology clinic. Providers from the multiple sclerosis, headache, movement disorders, and epilepsy divisions were included. Insight was gained as to which pharmacy services providers were initially most interested in utilizing. A month long pilot was held during which pharmacy services were implemented and data was collected. Specific data collected included number of referrals and patient interactions, number of medication reconciliations performed, number of discrepancies discovered, and subsequent interventions made. In order to assess the benefit of pharmacy services offered, cost avoidance of pharmacist interventions was analyzed. Prescription capture rates from March 2016 were compared to the pilot period of March 2017. Following the pilot, surveys were distributed to providers of the neurology clinic to assess and determine which pharmacy services added the most value to their patient population. **Results:** Results from the pilot will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

List the important stakeholders to seek input from when implementing pharmacy services in a neurology clinic

Describe the potential role of a pharmacist in a multidisciplinary neurology clinic setting

Self Assessment Questions:

When implementing pharmacy services in an ambulatory clinic, it is important to seek input from all of the following clinic stakeholders:

- A: Schedulers
- B: Nurses/Nurse Manager
- C: Healthcare Providers
- D: All of the above

What services could an ambulatory neurology pharmacist provide?

- A: Medication reconciliation
- B: Patient education
- C: Answering drug information questions
- D: All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-902L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF A CLINICAL PHARMACIST COMPETENCY PROGRAM

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Purpose: The purpose of this project will be to evaluate a pharmacist annual competency evaluation (PACE) program for clinical pharmacists at a single site. The results of this evaluation will be utilized to help in the advancement of the program in the future. **Methods:** The primary method of evaluation will be comparing pharmacists mean self-efficacy survey score pre and post-PACE. Pharmacist self-efficacy will be evaluated using two self-efficacy assessment surveys, the GSE scale and a pharmacist self-efficacy survey. Pharmacists self-efficacy will be evaluated pre-PACE at (less than 1 month prior) and post-PACE (1, 3, 6 months and one year). Secondary objectives will compare the difference between pre and post-PACE knowledge scores and pharmacist skills. Pharmacists skills will be evaluated during the competency day. A subgroup analysis of competency scores will be assessed evaluating if scores were affected by prior training or experience. **Results:** Results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Describe competency based assessment programs in the practice of clinical pharmacy.

Explain potential processes and evaluation techniques used to assess pharmacist competence.

Self Assessment Questions:

Which following statement is true?

- A: An individual's competence should be assessed using only test-based
- B: An individual's competence should be assessed using only skill-based
- C: An individual's competence should be assessed using only self-assessment
- D: An individual's competence should be assessed by using a combination of test-based, skill-based, and self-assessment

What clinical tasks should one focus on when creating a competency?

- A: Low volume, low risk tasks
- B: Low volume, high risk tasks
- C: High volume, low risk tasks
- D: High volume, high risk tasks

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-856L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

COMPARISON OF PATIENT ANTICOAGULATION OUTCOMES WHEN MOVED FROM CLINIC MANAGEMENT TO TELEPHONE MANAGEMENT SERVICES

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Background: At Froedtert & the Medical College of Wisconsin, the practice model for anticoagulation management underwent a major change on August 16, 2016. Prior to this, warfarin was managed either face-to-face by a pharmacist or nurse in clinic, or over the phone by a pharmacist or nurse if patients were deemed medically homebound or resided at a nursing home. As of August 16, 2016 the two nurse-led clinics were closed in order to comply with the Bipartisan Budget Act of 2015. To accommodate patients previously seen in the two closed clinics, patients could choose to continue face-to-face management or receive telephone management. All face-to-face visits are now managed solely by pharmacists, while all other patients are managed by nurses and pharmacists by telephone. The nurses utilize a standardized protocol for management. **Study Objective:** The primary objective of this project is to compare efficacy of warfarin management for patients who have transitioned to telephone encounters from in-person visits within Froedtert and the Medical College of Wisconsin health network. **Study Outcomes:** The primary outcome is time in therapeutic range (TTR) for patient INR values, calculated using the Rosendaal linear interpolation method. Secondary outcomes include percentage of INRs found to be in critical range ($\text{INR} \leq 1.5$ or ≥ 4.5), incidence of thrombotic and bleeding events leading to hospital admission, and number of warfarin and vitamin K prescriptions generated, respectively. **Methods:** This historical cohort study involved data from September 1st, 2015-December 31st, 2015 and compared it to data from September 1st, 2016-December 31st, 2016. Patients will serve as their own historical control from data collected in 2015 to data collected in 2016. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Explain the change in law that required for off-site clinics to be closed at Froedtert & the Medical College of Wisconsin

Discuss the differences seen between patients having their warfarin managed through clinic services versus through telephone services

Self Assessment Questions:

What part of the Bipartisan Budget Act (BBA) of 2015 led to Froedtert & the Medical College of Wisconsin closing two off-site anticoagulation clinics?

- A: Section 532 regarding reimbursement of nurse-managed clinics
- B: A change in reimbursement for outpatient prospective payment system
- C: Change in provider status for nurses and pharmacists
- D: The closing of the clinics was unrelated to the BBA of 2015

Based on previous studies, what is considered to be the average acceptable target for time in therapeutic range (TTR)?

- A: 40%
- B: 50%
- C: 60%
- D: 70%

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-584L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATING RATES OF METABOLIC MONITORING FOR SECOND GENERATION ANTIPSYCHOTICS AFTER IMPLEMENTATION OF A NEW POP-UP ALERT

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Purpose: Second generation antipsychotics (SGAs) are commonly prescribed for psychiatric conditions. Although there are many advantages over first generation antipsychotics, SGAs are known to cause metabolic side effects including diabetes, obesity, dyslipidemia, and metabolic syndrome. Because of these adverse effects, the American Diabetes Association, the American Psychiatric Association, the American Association of Clinical Endocrinologists, and the North American Association for the Study of Obesity developed consensus statement monitoring guidelines in 2004. The aim of this study is to evaluate the rate of metabolic monitoring at baseline and twelve weeks for newly prescribed SGAs after implementation of a new pop-up alert. **Methods:** This study is a retrospective cohort study comparing two groups of veterans at the Captain James A. Lovell Federal Health Care Center: those newly prescribed a SGA prior to when the pop-up was implemented and those newly prescribed an SGA after the pop-up was implemented. The time frame for retrospective chart review will be May 1, 2015 - December 15, 2015 for metabolic monitoring rates prior to the pop-up alert, and May 1, 2016 - December 15, 2016 for metabolic monitoring rates after implementation of the pop-up alert. Those included in the study will be veterans at the Captain James A. Lovell Federal Health Care Center who are at least 18 years old and are newly prescribed an SGA within the time periods listed above. Any patient prescribed an SGA for less than 90 days or "as needed" will be excluded from the study. The Chi-squared test will be used to compare the two cohorts, as well as compare the rates of inpatient metabolic monitoring and outpatient metabolic monitoring. A p value of less than 0.05 will be considered significant. Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss consensus guideline recommendations for metabolic monitoring of second generation antipsychotics

Describe adverse metabolic effects of second generation antipsychotics

Self Assessment Questions:

According to the American Diabetes Association, American Psychiatric Association, American Association of Clinical Endocrinologists, and North American Association for the Study of Obesity consensus s

- A: Baseline, 4 weeks, 12 weeks, then annually
- B: Baseline, 12 weeks, then annually
- C: Baseline, then annually
- D: Annually

What is a potential metabolic effect of second generation antipsychotics

- A: Hypoglycemia
- B: Weight loss
- C: Decreased serum prolactin
- D: Dyslipidemia

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-759L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF INTRAVENOUS (IV) TO ORAL CONVERSION (PO) OF MEDICATIONS: A LOOK AT OPPORTUNITY, COMPLIANCE, COST, AND POSSIBLE EXPANSION OF THE CURRENT PROCEDURE.

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Purpose: The intent of this study is to evaluate the current intravenous (IV) to oral (PO) conversion protocol at St. Elizabeth Healthcare Edgewood, Florence and Fort Thomas and the cost effectiveness of that policy. **Methods:** This study was granted exempt status by the St. Elizabeth Institutional Review Board. A one-year, retrospective chart review was conducted for 600 randomized patients who received one of eight medications on the current intravenous to oral conversion protocol: fluconazole, azithromycin, ciprofloxacin, levofloxacin, linezolid, metronidazole, famotidine, or pantoprazole. The following information was collected from patient electronic medical records: demographics (age, sex, height, and weight), hospital location, identified intravenous to oral medication, date eligible for intervention versus date of intervention, physician versus pharmacist intravenous to oral conversion. If applicable the difference between date of eligibility and date of intervention, cost savings associated with intervention and missed opportunity costs associated with failure to implement the current protocol were then calculated. **Results/Conclusion:** Preliminary data suggests the current policy is not being utilized to full potential; final results will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review established criteria for IV to PO conversion of medications.

Identify areas where health systems may benefit if IV to PO protocols are properly followed.

Self Assessment Questions:

1. Which of the following medication properties should be considered when selecting medications for an IV to PO procedure?

- A: Medication cost
- B: Administration time
- C: Medication bioavailability
- D: Dosing interval

On average, how much do hospitals save annually with IV to PO conversion protocols?

- A: \$4,000
- B: \$10,000
- C: \$40,000
- D: \$400,000

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-804L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATING THE IMPACT OF IMPLEMENTING THE CRITICAL CARE PAIN OBSERVATION TOOL TO GUIDE PAIN MANAGEMENT IN A MEDICAL INTENSIVE CARE UNIT

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Background: Intensive care unit (ICU) patients, particularly mechanically ventilated patients, frequently experience pain, with up to 70% of patients reporting pain during their stay. Adequately assessing and managing patients pain in the ICU has been associated with improved patient outcomes, including reduction in morbidity and duration of mechanical ventilation. The gold standard for assessing pain is patients self-report; however, ICU patients are often mechanically ventilated and/or have a decreased level of consciousness, preventing the use of this pain assessment method. If a patient's self-report of pain cannot be obtained, the use of validated behavioral pain scores is recommended. The critical care pain observation tool (CPOT) is a behavioral pain score that has been validated in both conscious and unconscious patients as well as intubated and non-intubated patients. The CPOT was recently implemented in the medical ICU (MICU) at Northwestern Memorial Hospital. **Methods:** This is a retrospective cohort study of adult MICU patients mechanically ventilated for ≥ 48 hours and receiving opioids for ≥ 24 hours. The control group is made up of patients from the 6 months prior to the implementation of the CPOT, and the study group consists of patients from the 6 months after the implementation of the CPOT. Pregnant women, opioid users, illicit drug users, patients with a history of alcohol abuse or in acute alcohol withdrawal, patients with acute neurologic injury, patients on therapeutic paralysis, and patients in sickle cell crisis were excluded. The primary outcomes include total opioids received (in morphine equivalents) and percentage of pain scores within satisfactory range. Secondary outcomes include duration of mechanical ventilation, duration of hospital stay, duration of ICU stay, and the presence of agitated delirium (Confusion Assessment Method for the ICU positive). **Results/Conclusions:** Results and conclusions of this study will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the Critical Care Pain Observation Tool (CPOT) and how it is used to assess pain

Explain the advantages of using the CPOT to assess pain in mechanically ventilated intensive care unit (ICU) patients

Self Assessment Questions:

Which of the following CPOT scores correctly depicts the possibility of the presence of pain?

- A: CPOT of 5
- B: CPOT of 2
- C: CPOT of 3
- D: A & C

Which of the following statements about the advantages of the CPOT is the most appropriate?

- A: It can quantify the severity of pain
- B: It has been validated in both intubated and non-intubated patients
- C: It can differentiate between agitation and pain
- D: It can identify agitated delirium

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-708L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

CONTINUOUS INFUSION KETAMINE FOR ADJUNCTIVE ANALGOSEDATION IN MECHANICALLY VENTILATED CRITICALLY ILL PATIENTS

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Achieving and maintaining adequate levels of analgo-sedation in the intensive care unit (ICU) is a fundamental part of routine patient care. Current therapies such as fentanyl, midazolam, propofol, and dexmedetomidine are associated with undesired hemodynamic effects, increased incidence of delirium, or lack of analgesia. Ketamine is a unique sedative and analgesic agent with emerging evidence assessing its use as adjunctive continuous infusion (CI) analgo-sedation. Used as an adjunctive agent, ketamine may allow for analgo-sedative dose-sparing effects while providing goal sedation with preserved respiratory drive, cardiovascular stability, and airway reflexes. The hypothesis of this study is initiation of adjunctive CI ketamine will be associated with decreased dosing requirements of concomitant CI analgo-sedative agents in mechanically ventilated, critically ill patients. This is a retrospective, single center, before-and-after study including mechanically ventilated, critically ill adult patients that received adjunctive CI ketamine for at least 12 hours in combination with at least one other CI analgo-sedative agent. The primary outcome assessed the percent relative reduction in analgo-sedative pharmacotherapy dosing 24 hours after CI ketamine initiation. Secondary outcomes included pre- and post-ketamine comparison of percent achievement of goal sedation assessment of adverse effect profile, percent delirium-free days, effect on vasopressor dosing requirements, mechanical ventilation duration, and ICU and hospital length of stay and mortality. Adverse effects evaluated include hypertension, hypotension, tachycardia, and emergence reaction prevalence. Patients were divided into a priori response cohorts based on their percent relative reduction including responders (> 50th percentile reduction in analgo-sedative requirements at 24 hours), partial responders (25-50th percentile), and non-responders (< 25th percentile). Logistic regression models were performed to identify factors associated with and independent risk factors for CI ketamine response. Data collection and analysis are ongoing.

Learning Objectives:

Review appropriate management and assessment of analgesia and sedation within the ICU

Discuss potential advantages of ketamine over conventional ICU analgo-sedative agents for mechanically ventilated patients

Self Assessment Questions:

Which of the following are potential pharmacologic advantages of ketamine over conventional ICU analgo-sedative agents for mechanically ventilated patients?

- A: Mechanistic ability to provide concurrent sedation and opioid sparing
- B: Possible emergence reactions leading to vivid dreams, hallucinations
- C: Preserved respiratory effort, cardiovascular stability, and airway reflexes
- D: Both A + C

Which of the following objective scoring scales is used to assess depth of sedation within the ICU?

- A: Confusion-Assessment Method (CAM)-ICU
- B: Richmond Agitation Sedation Scale (RASS)
- C: Critical Care Pain Observation Tool (CPOT)
- D: Objective Pain Assessment Score (OPAS)

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-304L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

TECHNICIAN EDUCATION ON CLEANROOM PROCESSES EMPLOYING VIRTUAL PHARMACY TECHNOLOGY OR "TEC PREP"

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Purpose: The purpose of this research is to measure the impact of a virtual cleanroom technology on inpatient pharmacy technician competency assessments, and perceived comfort-level, when working in a sterile processing environment. **Methods:** Pending IRB approval from Northwestern University, this process improvement project will evaluate pharmacy technicians before, and after, interacting with a virtual sterile processing room as a method of enhanced training. **Analysis** will focus on pre/post self-reported comfort level when working in the cleanroom environment as well as objective measures of technician competency. Data will be collected for a sample population of inpatient pharmacy technicians at a large, academic, medical center who have various degrees of experience in the sterile processing setting. The primary endpoint evaluated will be overall competency, as scored on that component of the survey. Additional analysis will include overall differences in comfort scores. **Results/Conclusion:** Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe common strategies for training pharmacy technicians on sterile compounding.

Identify virtual technology options developed to assist with training pharmacy students in sterile compounding processes.

Self Assessment Questions:

Which of the following is not a common strategy used to educate pharmacy technicians on sterile compounding techniques?

- A: Online didactic systems and videos
- B: Hands-on training and shadowing in a clean room
- C: Online virtual cleanroom simulation
- D: Workbooks, textbooks, and site-specific competency checklists

Which of the following is an example of technology developed to enhance sterile compounding training processes?

- A: Online virtual cleanroom simulation
- B: Smartphone application
- C: Gaming system video game
- D: A video conferencing system that brings trainees directly into a cleanroom

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-811L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

BEDSIDE CARDIAC MEDICATION COUNSELING AND ITS IMPACT ON POST-DISCHARGE MEDICATION LITERACY AND READMISSION RATES

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Purpose: The Centers for Medicare and Medicaid Services reduce reimbursements to hospitals with a high readmission ratio. To reduce readmissions, patient education was emphasized via specific counseling points, in-services to nursing staff, and post discharge telephone calls. The primary objective of this study was to evaluate the effect of inpatient bedside medication counseling for select cardiac patients on their medication literacy after being discharged back to the community. **Methods:** Patients with a diagnosis of acute myocardial infarction (AMI), heart failure (HF), and non-valvular atrial fibrillation or flutter (Afib/Aflutter) were included in this study. Historical control group data were collected from 10/01/15 and 12/31/15 and will be compared to study group data collected from 10/06/16 to 12/31/16. During the subjects hospitalization, nurses reviewed standardized medication counseling points for each medication used to treat the patients specific cardiac disease state. Following the subjects hospital discharge, the patients medication literacy was assessed by pharmacy staff within four days of discharge and again within 14 days of discharge using a standardized script during the telephone call. Two medications were chosen through a randomization process and subjects were asked to recall the selected medications purpose, strength, dose, frequency, and side effects. The primary outcome was 30-day readmission rates. The secondary outcomes included impact on patients perception of medication communication by hospital staff as measured by the Hospital Consumer Assessment of Healthcare Providers and Systems Survey (HCAHPS) score as well as patient knowledge and identification of their weakest medication understanding parameter. **Results:** Pre-implementation data revealed that 30-day readmission rates for AMI, HF, and Afib/Aflutter were 12.24%, 19.44%, and 8.82% respectively. The average HCAHPS score for communication about medications between all floors was 63.8%. Post-implementation results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Define the term "medication literacy"

Discuss methods to improve medication literacy

Self Assessment Questions:

Which of the following statements is most closely associated with medication literacy?

- A: The degree to which individuals can understand basic health information
- B: The degree to which individuals can memorize their prescription label
- C: The degree to which individuals can effectively use their medication
- D: The degree to which individuals can purchase large quantities of medication

What are some techniques to improve medication literacy?

- A: Using a "teach-back" technique and visual demonstrations
- B: Lecturing about medication side effects
- C: Providing a packet of medication information
- D: Giving a package insert and summarizing the information

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-321L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DEVELOPMENT AND IMPLEMENTATION OF A WORKFLOW TO ENROLL PATIENTS IN MANUFACTURER SPONSORED PRESCRIPTION ASSISTANCE PROGRAMS WITHIN A MULTI-HOSPITAL HEALTH SYSTEM

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PURPOSE: In 2014, Americans spent \$374 billion on medications. Additionally, 1 in 10 Americans reported not taking medications as prescribed due to cost. Pharmaceutical manufacturers offer prescription assistance programs (PAP) to increase access to medications. However, patients may be unaware of these programs or unable to complete the application without the help of an advocate. The health system currently subsidizes a portion of medication costs for uninsured and underinsured patients. The purpose of this project is to develop and implement a workflow to utilize PAP in order to reduce patient out-of-pocket costs and pharmacy drug expense at a multi-hospital health system. **METHODS:** The workflow will be implemented at an outpatient pharmacy and community clinic for uninsured and underinsured patients located at one hospital within a multi-hospital health system. Pharmacy drug expense and availability of PAP will be evaluated to identify medications to be included in this program. To be eligible, patients must be aged 18 years or older, legal residents of the United States, and receive subsidized prescriptions from the health system. Those who qualify for the services will be asked to complete a PAP application with the assistance of a pharmacy team member to be submitted to the manufacturer. The pharmacy team member will gather pertinent patient information to complete the PAP application including demographics, proof of residency, and income verification. If the application is approved by the manufacturer, the patient will be notified by pharmacy personnel and the medication will be dispensed from the outpatient pharmacy. Once the medication is obtained from the manufacturer, the pharmacy will label and track the medication using the pharmacy's management software. Outcomes to be evaluated include patient out-of-pocket costs and change in pharmacy drug expense. Results and conclusions will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the potential benefits to patients and healthcare organizations of utilizing manufacturer prescription assistance programs

Identify key steps needed to enroll patients in manufacturer prescription assistance programs

Self Assessment Questions:

Which of the following is a potential benefit to patients enrolled in prescription assistance programs?

- A: Decrease in pharmacy wait time
- B: Decrease in medication adherence
- C: Decrease in out-of-pocket medication expenses
- D: Increase in number of medications

A _____ is most often required to complete a prescription assistance program application.

- A: Physician's signature
- B: W-2 form
- C: Patient's phone number
- D: Social worker

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-739L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EXPLORING RARE ADVERSE EVENTS ASSOCIATED WITH PROGRAMMED CELL DEATH -1 INHIBITORS

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The primary aim of our study is to quantify the rate of laboratory proven immune related adverse events (irAEs) occurring with programmed cell death (PD-1) inhibitor therapy. IrAEs of interest include autoimmune nephritis, thyroiditis, hepatitis, diabetes mellitus and adrenal insufficiency. Secondary aims include times to therapy initiation, consult evaluation, and irAE resolution. A retrospective chart review was conducted for patients ≥ 18 years of age, who received at least two doses of a PD-1 inhibitor since August 2012. Key exclusion criteria included concurrent or previous anti-CTLA-4 therapy or systemic steroids in excess of physiologic doses. IrAEs were graded using Common Terminology Criteria for Adverse Events (CTCAE) v4.0. As of December 2016, 122 patients have been screened for enrollment. Of these, 41 were excluded due to anti-CTLA4 therapy administration and 13 received < 2 doses of PD-1 inhibitors. The majority of included patients (N=68) received nivolumab (56%) and had a diagnosis of lung cancer (50%). A total of 16 adverse events were identified and graded using CTCAEv4.0. Of these, 6 (14.9%) were defined as irAEs and included grade 4 autoimmune hepatitis (N=1), autoimmune thyroiditis (N=4), and adrenal insufficiency (N=1). Other adverse events included grade 1 hepatitis (N=5), grade 2 hepatitis (N=3) and grade 1 nephritis (N=2). When recommended per guidelines, time to steroid administration ranged from 5 - 98 days and time to consult evaluation ranged from 7 - 113 days, indicating areas for irAE management improvement. Time to irAE resolution currently ranges from 26 - 119 days; analysis is ongoing. Our results indicate that laboratory proven irAEs are prevalent and under recognized. Although guidelines for managing irAEs are available, detection is difficult, requiring symptom-based inquiries as well as stringent laboratory monitoring. Data analysis is ongoing to further quantify irAE incidence as well as develop a standardized monitoring algorithm for use at our institution.

Learning Objectives:

Discuss the novel mechanism of action of immune checkpoint inhibitors
Describe immune related adverse events in terms of incidence, monitoring and treatment

Self Assessment Questions:

Immune checkpoint pathways currently exploited for malignant disease state therapy include:

- A Pd-1
- B: Pdl-1
- C: Ctla-4
- D: All of the above

Patient AG is being treated with nivolumab for non-small cell lung cancer. She developed colitis after dose #3. Per CTCAEv4.0, the colitis is considered grade 2. Dose #4 was delayed but loose stool ha

- A Discontinue immunotherapy
- B Continue to delay therapy and start methylprednisolone 0.5 – 1 mg
- C Continue to delay therapy and start methylprednisolone 2 mg/kg/d
- D Continue to delay therapy and start infliximab

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-936L05-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION OF A CLOSTRIDIUM DIFFICILE TESTING ALGORITHM WITH PHARMACY PRE-AUTHORIZATION AND ITS IMPACT ON PATIENT OUTCOMES

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Purpose: The nationally reported metric for healthcare-onset Clostridium difficile infection (HO-CDI) relies solely on laboratory testing, which can result in over-reporting due to asymptomatic C. difficile colonization. A previous retrospective cohort performed at Northwestern Memorial Hospital (NMH) evaluated the appropriateness of C. difficile testing in patients diagnosed with HO-CDI based on the presence of symptomatic diarrhea over 1 year. Out of 168 cases of HO-CDI, 25 (14.8%) were considered inappropriate, 33 (19.6%) were appropriate, and 110 (65%) were indeterminate. As a strategy to prevent inappropriate testing, a C. difficile-testing algorithm was implemented at NMH in October 2016. Additionally, the Antimicrobial Stewardship Team (AST) reviewed laboratory C. difficile PCR orders and made recommendations to cancel the order if the test was determined to be inappropriate. The purpose of this retrospective study was to evaluate whether implementation of a C. difficile-testing algorithm with pharmacy pre-authorization negatively affects patient outcomes. Methods: All patients > 18 years old who were ordered a C. difficile PCR starting on their 4th day of hospitalization between October 2016 and December 2016 at NMH were evaluated by retrospective review of the electronic medical record. Each case was categorized by whether the patients C. difficile PCR test was sent to the microbiology lab to be processed without intervention, or whether the test was canceled as recommended by the AST. The primary endpoint was the incidence of severe CDI between patients who had their C. difficile PCR test sent without intervention compared to those who had a C. difficile PCR test subsequently re-sent following initial cancellation by the AST. Additional endpoints included the number of positive C. difficile PCR tests, and a composite of CDI-related complications during hospital admission, including toxic megacolon, colectomy, CDI-related death, and admission to an intensive care unit for CDI. Results/Conclusions: To be presented at Great Lakes.

Learning Objectives:

Identify causes for the increase in reported healthcare facility-onset Clostridium difficile infections

State the National Healthcare Safety Network's definition of healthcare facility-onset Clostridium difficile infection

Self Assessment Questions:

Which of the following is associated with an increase in reported healthcare facility-onset Clostridium difficile infections?

- A Increase in the use of toxin assays as part of the diagnosis of Clostridium difficile
- B: Increase in the use of molecular tests as part of the diagnosis of C. difficile
- C: Increase in the use of molecular tests in combination with toxin assay
- D: Increase in the use of isolation precautions when Clostridium difficile is suspected

The National Healthcare Safety Network defines healthcare facility-onset Clostridium difficile infection as:

- A Laboratory identified Clostridium difficile 48 hours after hospitalization
- B Laboratory identified Clostridium difficile plus at least 3 unformed stools
- C Laboratory identified Clostridium difficile 72 hours after hospitalization
- D Laboratory identified Clostridium difficile plus at least 3 unformed stools

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-814L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

COMPARISON OF 6-MONTH CONTINUATION RATES OF MELATONIN VERSUS OTHER MONOTHERAPIES FOR SLEEP DISORDERS IN THE VETERAN POPULATION

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Sleep disorders are widespread and largely detrimental to health and wellbeing. Current treatments for insomnia include medications with addiction potential or harmful side effects. Melatonin is a naturally-produced hormone which is thought to aid in regulation of the sleep cycle. As a sleep aid, melatonin lacks addictive properties and has a low potential for side effects. Little data exists on melatonin use for insomnia like sleep disorders compared to other prescription monotherapies used in clinical practice. The primary objective of this research project is to compare 6-month continuation rates of new-start monotherapies for sleep disorders versus melatonin. Secondary objectives include Medication Possession Ratio (MPR) if the therapy was continued and duration of therapy and reason for discontinuation if the therapy was discontinued. This study will utilize retrospective chart review to obtain data. Patients will be included if they were initiated (no prior use within 180 days) on melatonin, zolpidem, a benzodiazepine (diazepam, clonazepam, temazepam, lorazepam, oxazepam with QHS or QHS PRN dosing), trazodone (QHS or QHS PRN dosing), hydroxyzine (QHS or QHS PRN dosing), or quetiapine (QHS or QHS PRN dosing and $\leq 200\text{mg/day}$) as monotherapy for a sleep disorder. The electronic medical record system will identify outpatient prescriptions from the Lexington VA Medical Center between October 7, 2015 and April 4, 2016. Patients who received the medication for an indication other than a sleep disorder or who were concurrently prescribed another medication meeting inclusion criteria for this study will be excluded. Sleep disorder indication, concomitant contributing medications, and presence of certain concomitant conditions will be assessed. Student's T test will be used to determine the primary endpoint, ANOVA will be used to compare MPR and duration of therapy, and Chi-square test will be used to identify differences in reason for discontinuation. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the proposed mechanism of melatonin in the treatment of sleep disorders.

Recognize treatment scenarios where melatonin may be preferable compared to current therapies for sleep disorders.

Self Assessment Questions:

Which of the following statements is correct?

- A Melatonin acts as a histamine (H1) receptor antagonist
- B: Melatonin binds to receptors in the hypothalamus
- C: Melatonin is available over-the-counter and is generally regarded as safe
- D: Use of melatonin is commonly associated with dependence and withdrawal

In which of the following scenarios would melatonin be preferable compared to current therapy?

- A A 60 YO female with a history of depression currently taking trazodone
- B A 29 YO female with severe allergies taking hydroxyzine for insomnia
- C A 36 YO male with recent history of prescription drug abuse currently on quetiapine
- D A 45 YO male with depression uncontrolled on fluoxetine monotherapy

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-541L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EFFECT OF BETA-LACTAM PLUS MACROLIDE VERSUS FLUOROQUINOLONE ON 30-DAY READMISSION RATES FOR TREATMENT OF INPATIENT COMMUNITY-ACQUIRED PNEUMONIA

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Purpose: Approximately 25 out of every 10,000 patients are hospitalized annually in the United States due to community acquired pneumonia (CAP), and up to 20% of these patients will be readmitted within 30 days of initial discharge. As federal reimbursement can be reduced for hospitals exceeding the national standard rate for 30-day readmissions for certain diagnoses, controlling readmissions contributes to financial stability for many healthcare institutions. The purpose of this study was to determine if 30-day readmission rates in patients treated for inpatient CAP in a regional hospital differed between those treated with a beta-lactam plus macrolide or a fluoroquinolone. A retrospective cohort study was conducted at Mayo Clinic Health System - Franciscan Healthcare, including all patients age ≥ 18 years old admitted from December 2011 through December 2016 with a diagnosis of CAP. Patients receiving a 3rd generation cephalosporin plus macrolide were compared with patients receiving a fluoroquinolone, with exclusion criteria including: concurrent or recent usage of study antibiotics; death, transfer, or transition to hospice; and diagnosis of hospital-acquired pneumonia or healthcare-associated pneumonia. The following data was collected and analyzed: 30-day readmission rates, antibiotic regimens, demographics, pneumonia severity index, and comorbidity scores. Demographic data was assessed using descriptive statistics, and treatment groups were controlled using the severity and comorbidity scores. Association between treatment group and readmissions was assessed using logistic regression, and the readmission proportions between groups were compared using a chi-square test and odds ratios with a 95% confidence interval.

Results and Conclusions: Data collection is ongoing; results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the Medicare national rate of 30-day readmissions for patients with CAP.

Recognize appropriate antibiotic regimens for the empiric treatment of CAP.

Self Assessment Questions:

Based on Medicare national rates (July 2012 - June 2015), approximately how many CAP patients are readmitted within 30 days of initial discharge?

- A 1-3%
- B: 5-10%
- C: 15-20%
- D: 40-50%

Which of the following are appropriate initial antibiotics for the treatment of inpatient CAP?

- A A.Ceftriaxone/ Azithromycin
- B B.Cefepime/ Metronidazole
- C C.Levofloxacin
- D D.Both A and C

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

SINGLE-CENTER DEVELOPMENT OF A CREATININE CLEARANCE EQUATION IN HOSPITALIZED PATIENTS

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Purpose: This study's purpose is to determine a creatinine clearance (Clcr) equation that more accurately predicts Clcr, as compared to measured Clcr by 8- or 24-hour urine collection. **Methods:** This was a retrospective study including patients hospitalized from January 1, 2013 to November 31, 2016 who were 18 years or older with one 8- or 24-hour measured urine collection and two serum creatinine values during their hospitalization; one within 24 hours of the measured urine collection. Patients were excluded if they were pregnant, incarcerated, admitted to a burn or trauma intensive care unit, had a diagnosis of cystic fibrosis or muscular dystrophy, or had renal impairment. Renal impairment was defined as patients with acute kidney injury, chronic kidney disease stage 4 or 5, or patients on renal replacement therapy. The following data points were collected for each patient meeting study inclusion: patient demographics, nutrition status, co-morbidities, activities of daily living scores, as well as exposure to nephrotoxic medications. Total Benchmark Solutions was used to assist with data collection. This study was approved by the Franciscan St. Francis Health Institutional Review Board. The primary endpoint was to identify and compare clinical variables that influence Cockcroft-Gault Clcr estimate accuracy, as compared to a measured urine collection in a diverse, hospitalized patient population. The secondary endpoints were to assess the clinical impact of weight, age, gender, co-morbidities, activities of daily living scores, and other clinical variables on measured Clcr. **Conclusions:** Two-hundred and forty-seven patients have been screened for study inclusion. Final results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe clinical variables that influence creatinine clearance and estimates of creatinine clearance.

Identify limitations of the creatinine clearance estimate equations commonly used in clinical practice.

Self Assessment Questions:

What patient factors and aspects of renal function are not accounted for in the current creatinine clearance estimate equations?

- A: Age
- B: Gender
- C: Weight
- D: Co-morbidities

In validation studies of Cockcroft-Gault, how was equation accuracy defined?

- A: Within 15-20% of measured creatinine clearance
- B: Within 20-30% of measured creatinine clearance
- C: Within 30-50% of measured creatinine clearance
- D: Within 50-80% of measured creatinine clearance

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-841L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF PERIOPERATIVE MEDICATION REGIMENS IN BARIATRIC SURGERY PATIENTS

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Title: Evaluation of perioperative medication regimens in bariatric surgery patients **Purpose:** Bariatric surgeries present a unique challenge with regard to the effects these procedures have on medication efficacy and safety. While medication-specific data is limited certain issues concerning pharmacokinetics in patients who have undergone bariatric surgery can be anticipated. With the possibility of altered pharmacokinetics, it is important to evaluate medication regimens in these patients. There is a lack of literature evaluating the role of the pharmacist in the care of this patient population. Pharmacists may have an opportunity to intervene in the management of bariatric patients medication therapy by utilizing their knowledge and expertise of pharmacokinetics and dosage forms to impact patient care and outcomes. The primary objective of this project is to describe the medication-related issues that exist in the period of time surrounding bariatric surgery. **Methods:** This study is a retrospective, electronic chart review of patients undergoing bariatric surgery at Cleveland Clinic Akron General by a pre-identified surgeon from the Bariatric Center from January 1, 2016 to December 31, 2016. Medication lists will be evaluated at the following time points: pre-surgery, hospital admission, hospital discharge, first post-surgery follow up visit, and the six-month post-surgery follow up visit. The primary outcome is the total number of possible medication-related issues identified at each of the defined time points, as well as the total number of possible medication-related issues in each of the following categories at each time point: recommended medications that are absent; medications that are not recommended but are present; and narrow therapeutic index medications that are present. The secondary outcome is the identification of possible predictors of having greater than or equal to the median number of medication-related issues at each of the defined time points. **Results and Conclusions:** Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize the recommended vitamin supplementations required in post bariatric patients

Identify medications that may be inappropriate for patients who have undergone bariatric surgery

Self Assessment Questions:

According to the 2013 update to the Clinical Practice Guidelines for the Nutritional, Metabolic, and Nonsurgical Support of the Bariatric Surgery Patient, which of the following are the most appropriate

- A: Potassium, calcium carbonate, and vitamin B 12
- B: Calcium citrate, cholecalciferol, and multivitamin
- C: Cholecalciferol, vitamin B12, vitamin E
- D: Calcium carbonate, multivitamin, vitamin B 12

Which of the following medications has increased potential for adverse effects in a patient post-bariatric surgery?

- A: Amlodipine
- B: Ursodeoxycholic acid
- C: Ibuprofen
- D: Pantoprazole

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-469L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

STANDARDIZED PROCESS FOR IMPROVING MEDICATION ADHERENCE WITH HIGH-RISK HEART FAILURE PATIENTS

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Heart failure affects nearly 5.7 million people living within the United States. It is associated with increased morbidity, mortality, and considerable health care costs. Medication is a key component for prevention of symptom exacerbation's and disease progression. Adherence to medication regimens is essential for guideline directed management. Non-adherence to medication is reported in up to 40-60% of heart failure patients. Additionally, 44% of patients are readmitted within six months of hospital discharge. Pharmacists are equipped to optimize drug regimens and identify barriers to medication adherence. A recent meta-analysis showed pharmacist care was associated with a significant reduction in heart failure hospitalizations and a trend towards decreased mortality. The purpose of this project is to develop and implement a tool to improve and better facilitate transitions of care and patient medication adherence via directed pharmacy intervention within the heart failure population. Methods: A literature review will be conducted to assess patient risk factors for medication non-adherence. Using this literature evaluation, an objective assessment to assess risk of medication non-adherence will be developed. The assessment will focus on patient reported medication adherence, barriers, and patient knowledge. This will be built into the electronic medical record and incorporated into patient interviews for heart failure patients in the hospital and advanced heart failure clinic. Depending on the total calculated score, patients will be flagged for follow up with a pharmacist. On follow up the pharmacist will utilize the same assessment to aid in directed pharmacy intervention. Consecutive assessment scores will be documented within the electronic medical record giving the ability to assess score changes over time and through transitions of care. The primary outcome will be changes in patient adherence risk scores. The secondary outcome will be heart failure hospitalizations. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the importance of medication adherence interventions within the heart failure population

Identify three risk factors for medication non-adherence in the heart failure population

Self Assessment Questions:

Medication non-adherence in heart failure patients is associated with which of the following?

- A: Increased heart failure hospitalizations
- B: Decreased total health care costs
- C: Improvement in quality of life
- D: Decreased morbidity and mortality

Which of the following is associated with increased medication adherence in heart failure patients?

- A: Increased severity of heart failure
- B: Increased frequency of heart failure medication dosing (twice daily)
- C: Increased health literacy
- D: Increased medication copay amounts

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-673L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

SAFETY OF STATIN THERAPY AFTER LIVER TRANSPLANTATION

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Purpose: Cardiovascular disease remains a leading cause of long-term mortality in transplant patients. A risk factor for CVD is hyperlipidemia, where the treatment is statin therapy. The use of statins in liver transplant (LT) may be challenging because of drug interactions with immunosuppression and concerns over elevations in liver enzymes. The objective of this study was to assess the incidence of transaminase elevation and safety of statin use after LT. Methods: A retrospective chart review of LT recipients at an academic medical center from January 2013 to December 2014 was performed. All LT recipients with ICD-9/10 codes of hyperlipidemia were eligible. Primary endpoint was an increase of greater than 2 times the baseline liver enzymes in patients on statin therapy compared to no statin therapy. Secondary endpoints included adverse effects, rejection, and patient or graft survival. Results: Out of the 170 liver transplants completed, 123 patients had a diagnosis of hyperlipidemia. One hundred-four patients met inclusion criteria with 37 patients receiving statin therapy. Median time to statin initiation was 6 months post-transplant. There was no difference in the incidence of transaminase elevations in the statin arm compared to non-statin arm. Adverse reactions were reported in 5.4% of patients on a statin. Majority of patients on statin therapy received a moderate intensity statin (59.5%). Only 8.1% (n=3) patients in the statin arm had an episode of rejection compared to 29.9% (n=20) in the non-statin (p=0.01). There was no difference in graft or patient survival. Conclusion: In this study, the use of statin therapy after LT did not cause significant elevations in liver enzymes. Although there was no difference in patient or graft survival, the statin arm had significantly less episodes of rejection. Further investigation is needed to determine if statin use decreases the incidence of rejection.

Learning Objectives:

Identify mechanisms of hyperlipidemia in the solid organ transplant population

Describe safety concerns of the use of statins in liver transplant patients

Self Assessment Questions:

Why are solid organ transplant recipients at higher risk for developing hyperlipidemia?

- A: Sirolimus inhibits the uptake of lipids into adipocytes
- B: Tacrolimus increases LDL clearance
- C: Sirolimus increases the uptake of lipids into adipocytes
- D: Cyclosporine increases LDL clearance

What are some safety concerns with the use of statin therapy?

- A: Nephrotoxicity
- B: Elevation in transaminases
- C: Decrease in tacrolimus concentration
- D: Ototoxicity

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-350L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION AND EVALUATION OF PUBLIC HEALTH OUTREACH EVENTS AS RESIDENT TEACHING EXPERIENCES

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Purpose: Mitigating negative effects of health disparities is a goal of public health initiatives. Offering medication reviews through outreach events is one approach to achieve this goal. Such events may be ideal for pharmacy residents to gain additional teaching opportunities with the participation of fourth year pharmacy students. The objective of this study is to assess feasibility of implementing outreach events, and to evaluate their impact on the public through evaluation of interventions made, as well as through patient reported satisfaction of these events. There is also an opportunity to determine if a benefit exists in near-peer teaching. **Methods:** Medication review events will be scheduled at least monthly in a hospital-based outpatient pharmacy. Prior to each event, residents will lead a topic discussion for students on conducting a medication review, providing an opportunity to answer questions. Patients who consent to a pre- and post-survey will be included in data analysis; Patients who do not consent can take part in this service yet will not be included in analysis. The pre-survey will assess number of medications, if the patient receives help with their medications, use of adherence aid, ability to read prescription labels, and self-reported understanding of medications. During the review, students will document patient knowledge of the following information for each medication: indication, dose, instructions for use, and associated adverse effects. Patients will be educated on unknown information. Upon completing the review, the post-survey will again assess patient self-reported understanding of their medications as well as overall satisfaction with the event. Following each event the resident will debrief with students, answering questions or concerns. A survey will then be administered to gauge students' experience with near-peer teaching. Resident preparedness and ability to answer questions, as well as student comfort level with said resident will be assessed. **Results and Conclusions:** In progress

Learning Objectives:

Identify what patients found to be beneficial from the medication reconciliations performed.

Recall limitations encountered during medication reviews.

Self Assessment Questions:

What aspect of the medication reconciliation did patients most positively respond to?

- A The medication education provided
- B The opportunity to discuss their medications
- C Errors identified in the review
- D Improved baseline knowledge of prescriptions

Which of the following list represent limitations encountered during medication reviews?

- A One site, comprehension, language barriers
- B One site, comprehension, no chart access
- C Comprehension, no chart access, time for the interaction
- D No chart access, time for the interaction, one site

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-733L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DOES PHARMACIST INTERVENTION AFFECT PRESCRIPTION FILL RATES OF ANTIPLATELET MEDICATIONS FOLLOWING A PERCUTANEOUS CORONARY INTERVENTION (PCI) WITH STENT PLACEMENT? A COMPARISON OF CURRENT AND HISTORICAL STANDARDS OF CARE

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Purpose: Transitioning from the hospital to home is a vulnerable period of time for patients, including patients being discharged after a PCI with stent placement. For these patients, prompt filling and compliance with antiplatelet medications such as ticagrelor, prasugrel, and clopidogrel, is essential in preventing myocardial infarctions and death, risks of which are greatest within the first 30 days following hospital discharge. Due to the vulnerability of these patients, a new process was implemented at SwedishAmerican Hospital (SAH) that specifically involves the pharmacist in the discharge process. By involving the pharmacist in the discharge process, there is a potential to increase fill rates of antiplatelet medications and possibly improve clinical outcomes. **Methods:** This prospective study evaluated a pharmacist intervention and included patients with a PCI with stent placement and who received a loading dose of an antiplatelet medication between November 2016 and January 2017. The pharmacist intervention included counseling the patient regarding the indication, side effects, and consequences of noncompliance and offering to fill the antiplatelet medication at the SAH outpatient pharmacy. If the patient elected not to fill at the SAH outpatient pharmacy, a follow-up phone call was made to the patient within 72 hours to assess if the patient filled the medication elsewhere. A retrospective review from the same timeframe from the previous year was used to compare prescription fill rates during a period where a pharmacist was not specifically involved in the discharge process. Secondary outcomes included a comparison of hospital readmission rates due to restenosis or myocardial infarction between the two groups. Additionally, net revenue was reported. **Results:** Data results and conclusion will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain the importance of antiplatelet medications following PCI

Review the risks of non-compliance of antiplatelet medications

Self Assessment Questions:

Which of the following medications are recommended to prevent restenosis?

- A Apixaban
- B Enoxaparin
- C Ticagrelor
- D Any of the above options will prevent restenosis

Which of the following is a consequence of any delay in filling an antiplatelet medication after stent placement?

- A Increased risk of myocardial infarction
- B Increased risk of death
- C Increased risk of restenosis
- D All of the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-408L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

URAC 2.0 VERSUS 3.0 SPECIALTY PHARMACY STANDARDS: GAP ANALYSIS AND CLOSURE

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Purpose: Specialty pharmacies focus on providing high-quality, patient-centered clinical services to patients with rare or serious disease states, such as autoimmune conditions, cancer, and hepatitis C. Being accredited by an agency such as URAC might allow a specialty pharmacy to gain access to limited-distribution drugs to treat these conditions, and improve the likelihood to receive compensation from third-party payers for specialty pharmacy services. While Aurora Specialty Pharmacy is currently in compliance with the URAC 2.0 specialty pharmacy standards, it is necessary to ensure compliance with the URAC 3.0 specialty pharmacy standards for the upcoming re-accreditation since the standards evolve over time. The purpose of this project is to analyze and create a gap analysis of URAC 3.0 specialty pharmacy standards as compared to previous URAC 2.0 specialty pharmacy standards, and implement an action plan for gap closure to facilitate re-accreditation for Aurora Specialty Pharmacy. **Methods:** URAC 2.0 and 3.0 specialty pharmacy standards were analyzed and compared to identify differences. These differences were compared to the current state of practice at Aurora Specialty Pharmacy, and areas of non-compliance to the new 3.0 specialty pharmacy standards were recorded in a gap analysis. Lastly, a plan was made to close these gaps through changes and/or additions to policies, procedures, and workflows. **Results:** Preliminary results show that changes have been made to 40 of the 92 URAC 2.0 specialty pharmacy standards, as compared to the URAC 3.0 specialty pharmacy standards. Of these 40 standards, Aurora Specialty Pharmacy policies, procedures, and/or workflows are not in full compliance with 28 standards. Efforts are now being made to update and/or create policies, procedures, and/or workflows with a goal of 100% compliance with the URAC 3.0 specialty pharmacy standards. **Conclusion:** Results and conclusions of this study will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize the advantages of a specialty pharmacy becoming accredited
Identify at least two benefits of a specialty pharmacy being integrated with a health system.

Self Assessment Questions:

Which of the following advantages may accredited specialty pharmacies experience?

- A: Manufacturers may grant access to limited-distribution medication
- B: Payers may reimburse submitted prescription claims.
- C: Seal of accreditation may be used in marketing materials.
- D: All of the above.

Which of the following are benefits of specialty pharmacy integration within a health system?

- A: Access to the patient's electronic medical record.
- B: Building collaborative relationships with providers.
- C: Increased revenue to the health system.
- D: All of the above.

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-771L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

SURVEY TO EXAMINE THE PERCEPTIONS OF MANUFACTURER COPAY SUBSIDY COUPONS FOR SPECIALTY DRUG PRODUCTS FROM COMMERCIAL PAYERS AND MEMBERS

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Purpose: To collect and analyze perceptions of manufacturer copay coupons use for specialty drugs among commercial payers and specialty-utilizing members. **Methods:** A 10-item survey was sent from October 10, 2016 to November 23, 2016 to a subset of commercial payers and members of a specialty pharmacy. Seven of the 10 items asked the individuals to respond with their level of agreement to the corresponding statement using a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). Responses to the items on the survey were compared between these two groups using student t-test.

Results: Seventy-eight (7.8%, n=1000) member responses and 15 (50.0%, n=30) payer responses were returned over the six week survey period. Forty-three (55.1%) members stated previous copay coupon use while 35 members (44.9%) stated no previous coupon use and were exempt from the remainder of the survey. Payers responded with a higher degree of agreement than members to "Copay coupons for specialty medications encourage members to ask their prescribers to start or switch treatments to the promoted medication" (4.13 vs. 2.42, P<0.001); "Only the amount members pay out-of-pocket should be contributed to their deductible/maximum out-of-pocket cost" (4.40 vs. 3.44, P<0.01); and "Copay coupon programs increase the overall cost of medications" (3.73 vs. 2.16, P<0.001). Payers responded with less agreement than members to "Members using copay coupons for their specialty medications are contributing the cost share that they are responsible for, according to their health plans design" (2.53 vs. 4.02, P<0.001). **Conclusions:** Commercial payers and specialty-utilizing members shared a common perspective when considering a copay coupons ability to alter patient access. However, these perspectives differed considerably when considering a copay coupons ability to influence treatment choices, how cost share dollars should be allotted when using copay coupons, and how copay card utilization affects the overall cost of medications.

Learning Objectives:

Describe the patterns of copay card utilization and the short- and long-term cost effects of use.

Report the perceptions and importance of copay card utilization from both a payer and patient perspective.

Self Assessment Questions:

AS receives a prescription for a TNF inhibitor for her RA and it is being filled by a specialty pharmacy. The total cost to her and her plan is \$5,000 per fill. Her coinsurance is 20%. She cannot afford

- A: Third Party Payer
- B: AS
- C: Pbm
- D: Manufacturer

Why might copay card utilization be appropriate to provide better access to specialty medications than more common retail medications (e.g., Lipitor)?

- A: Specialty drugs are typically placed at the highest cost-share tier
- B: Extremely limited to no low-cost generic options for specialty drugs
- C: Prior authorization approval already ensures appropriate therapy
- D: All of the above

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-769L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF THE IMPACT OF A GRAVIMETRIC IV WORKFLOW SYSTEM ON ERROR RATES IN INPATIENT STERILE COMPOUNDING

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Purpose Sterile compounding of intravenous medications is a source of potential life threatening errors within hospital pharmacies. Current standards of practice requires the technician to select the correct medication and base fluid, and accurately draw up the medication using volumetric measurement. The pharmacist then utilizes the pull-back method to check that the product was prepared following best practices and the organizations policies and procedures. There is risk of selecting the wrong medication or base solution, incorrect dose drawn up, variability in syringe accuracy, and lack of documentation regarding product preparation. The release of an innovative IV workflow system utilizing barcode scanning and gravimetric workflow based on the density of the drug will ensure that the correct medication, the correct concentration, and the accurate dose is dispensed. This is done through barcode scanning of the medication and base solution prior to compounding and using the weight of the medication as the unit of measurement. The workflow system also includes real time documentation of the compounding process including the medications scanned, the concentration of diluted medications, the weight of the dose, and visualization through photographs of each step. Methods Prior to the implementation of the IV workflow system the volumetric process was evaluated by weighing the base solution before and after medication was added to the bag. The difference in the beginning and end weight was calculated to determine the precision within the batches. After the implementation of the IV workflow system the pre-and post-weight of the bags will be recorded. The data collected before and after implementation will be compared to determine the accuracy of the volumetric process and the impact the IV workflow system has on the error rates when compounding sterile intravenous medications. Results Data results and conclusion will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the differences between gravimetric and volumetric workflow
Identify the benefits of using barcode scanning and gravimetric workflow

Self Assessment Questions:

Which of the following is a component of gravimetric workflow but not volumetric workflow?

- A barcode scanning of drug
- B: weight of drug
- C: pharmacist verification
- D: decreased waste

Which of the following is a benefit of using gravimetric workflow?

- A faster compounding
- B requires fewer technicians
- C more accurate compounding
- D decreases waste

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-972L05-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

CALCIUM APPLIED TO THE HEMORRHAGE AFTER THROMBOLYSIS (CHAT) SCORE TO PREDICT INTRACEREBRAL HEMORRHAGE AND OUTCOME AFTER THROMBOLYSIS FOR ACUTE ISCHEMIC STROKE IN A COMMUNITY HOSPITAL EMERGENCY DEPARTMENT

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Intracerebral hemorrhage (ICH) is a devastating complication of acute ischemic stroke and a known risk associated with the use of recombinant tissue plasminogen activator (tPA) for thrombolysis of acute ischemic stroke. Although the use of tPA has demonstrated improved neurologic function following acute ischemic stroke, there have also been many reported bleeding adverse events. The hemorrhage after thrombolysis (HAT) score is a proposed risk stratification instrument that was created in 2008 for predicting ICH and outcome after treatment with tPA. In the past few years there have been studies showing a reported correlation between serum calcium levels and hemorrhagic conversion after tPA. We sought to evaluate if the addition of calcium levels to the HAT score would provide useful stratification.

This study is a retrospective, single-center, cohort study of patients who had received tPA for the primary diagnosis of acute ischemic stroke from January 2012 to September 2015. Patients were obtained from the previous HAT score validation study with a serum calcium and albumin level or ionized calcium drawn prior to administration of tPA. Patients were excluded from the study if they received tPA at an outside institution, did not have serum calcium levels drawn, or experienced a traumatic intracranial hemorrhage. The prevalence of bleeding was determined by the previous study. A new multivariable logistic regression model predicting bleeding rates has been developed with the addition of calcium to the HAT score based on presenting NIHSS score, blood glucose level and history of diabetes, and initial head CT. Mann-Whitney test will be completed to measure the ability of the HAT and CHAT score to predict hemorrhagic conversion. Research is currently in the data collection phase. Results and conclusions of the study will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify benefits and risks with tPA therapy for treatment of ischemic stroke

Describe a potential mechanism to serum calcium levels are associated with poor outcomes among patients with ischemic stroke

Self Assessment Questions:

Which electrolyte is associated with hemorrhagic transformation after thrombolysis?

- A Magnesium
- B: Phosphate
- C: Calcium
- D: Potassium

Which pathway does calcium play a role as an essential cofactor?

- A Acidosis
- B Coagulation Cascade
- C Eclampsia Management
- D Oxygen Transport

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-423L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

MAKING A DIFFERENCE IN STAPHYLOCOCCUS AUREUS BACTEREMIA

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Purpose: While data exists to support a reduction in mortality from Staphylococcus aureus bacteremias with treatment guideline adherence, compliance in practice is suboptimal. A S. aureus bacteremia guideline was developed at University of Kentucky HealthCare outlining evidence-based recommendations. A study at the aforementioned institution utilized antimicrobial stewardship recommendations for S. aureus bacteremia patients, encouraging adherence to evidence-based guidelines while comparing pre- and post-guideline development data. This study demonstrated a significant increase in appropriateness of therapy with no difference in total guideline adherence or mortality, likely due to small sample size. The primary objective of the current study is to evaluate associations between an antimicrobial stewardship consult and all-cause mortality in S. aureus bacteremia patients within 30 days of diagnosis. Secondary objectives include analysis of total guideline adherence and appropriateness of therapy. **Methods:** A quasi-experimental approach evaluated a pre-implementation period from 2014-2015 and a post-implementation period from 2015-2017 for a S. aureus bacteremia guideline at the institution. A previously developed antimicrobial stewardship consult template was utilized to write notes providing guideline-based recommendations for all patients. Inclusion criteria consisted of patients 18 years or older with first time S. aureus bacteremia diagnosis identified by the Verigene Nanosphere rapid diagnostic system. Patients were excluded if receiving comfort care only if transferred to another facility or if they expired within 48 hours of the first positive blood culture. Notes were written in the medical record at 48-72 hours and 5-7 days after collection of the first positive blood culture, as well as on the last day of therapy or day of discharge, whichever came first. **Results and Conclusion:** Data collection and analysis is ongoing. Thus far, 150 patients in the pre-protocol and 151 patients in the post-protocol implementation groups are included. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review the risk factors associated with worse outcomes in Staphylococcus aureus bacteremias.
Discuss opportunities to decrease overall mortality in Staphylococcus aureus bacteremias.

Self Assessment Questions:

Which of the following should be included in the definition of total guideline adherence?

- A: Appropriateness of therapy (targeted antimicrobial and adequate coverage)
- B: Source control within 24 hours of presentation
- C: Fever defervescence within 48 hours of presentation
- D: Negative blood cultures within 24 hours

Which of the following are associated with Staphylococcus aureus bacteremias?

- A: Increased morbidity
- B: Decreased morbidity
- C: No association with morbidity
- D: Acute kidney injury

Q1 Answer: A Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-620L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATING THE EFFECTIVENESS OF BLOOD GLUCOSE MANAGEMENT PRE- AND POST- PROTOCOL IMPLEMENTATION IN ACUTE CORONARY SYNDROME (ACS) PATIENTS

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Purpose: An established link exists between hyperglycemia and mortality in ACS patients, although the optimal goal blood glucose range and treatment modality has yet to be defined. Controversy regarding ACS blood glucose management stems from several studies providing conflicting mortality results with aggressive glycemic control. The goal of our study is to determine the impact of a new institutional glycemic control protocol that was implemented in May of 2016 at our community teaching hospital. We expect to evaluate the safety and efficacy of this glycemic control protocol by comparing pre- and post- protocol patient outcomes. **Methods:** ACS patients admitted with an elevated blood glucose value greater than 180 mg/dL and a hospital length of stay of 48 hours or longer were eligible for review. Patients admitted between October 2015 and April 2016 were assigned to the pre-protocol cohort, while patients admitted between June 2016 and October 2016 were assigned to the post-protocol cohort. Patients admitted in May of 2016 were excluded to eliminate confounding variables that may be associated with a potential protocol learning curve. Eighty-one patients from the pre-protocol period and fifty-four patients from the post-protocol period will be needed to achieve an 80% power and detect a statistically significant ($\alpha=0.05$), between group blood glucose difference, of 15 mg/dL. The primary objective of this study is to evaluate the efficacy of blood glucose management. The secondary objectives consist of determining patient outcomes and safety. The following outcome measures will be evaluated: time to blood glucose normalization, hyperglycemic index and average blood glucose value at 24 and 48 hours, time to blood glucose normalization, hospital length of stay, mortality and readmission rate at 30 days, hypoglycemic event status at 48 hours, and readmission rate secondary to ACS.

Results/Conclusion: Final data to be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the recommended blood glucose target range for general medicine and critically ill surgical patients.
List at least one new improvement in ACS patient care that has evolved in the last decade.

Self Assessment Questions:

What is the recommended blood glucose range for general medicine and critically ill surgical patients?

- A: 140-180 mg/dL
- B: 140-160 mg/dL
- C: 120-180 mg/dL
- D: 120-140 mg/dL

Which of the following are relatively new advances in ACS patient care that have occurred within the last 20 years?

- A: Dual antiplatelet therapy
- B: Introduction of aldosterone antagonists
- C: Glycoprotein IIb/IIIa inhibitor utilization during percutaneous coronary intervention
- D: All of the above

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-563L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

A RETROSPECTIVE REVIEW OF EMERGENCY DEPARTMENT DISCHARGE PRESCRIPTION APPROPRIATENESS AT AN ACADEMIC MEDICAL CENTER

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Purpose: To determine the potential for pharmacist interventions on prescriptions written for patients discharged from the emergency department (ED) as well as identify medications to target for future prospective review implementation. **Methods:** A report of all discharge prescriptions written by providers from The Ohio State University Wexner Medical Center (OSUWMC) University Hospital (UH) ED from April 1st, 2016 to June 30th, 2016 was obtained. Certain medication classes were excluded from this pilot study based on suspected low intervention yield or pre-existing standards as determined by the study team. Of this, a random sample of 250 prescriptions was then analyzed to determine the possible impact of pharmacist intervention, allowing the possibility of multiple potential interventions for each discharge prescription. Interventions were identified and categorized to allow for analysis as a group and by intervention type. **Results:** A total of 13,242 discharge prescriptions were written from the OSUWMC UH ED during the three months. Of the sample of 250 prescriptions, 35 (14%) were identified as having intervention potential. Cephalosporins and fluoroquinolones were identified as having the most opportunities for pharmacist intervention with 12 and 4 identified interventions, respectively. The majority of potential interventions (34.3%) involved medication dose adjustments. Clarification of past medication allergies or intolerances were identified for two prescriptions. A total of four prescriptions warranted more than one potential pharmacist intervention. **Conclusion:** After excluding several medication classes, 14% of discharge prescriptions were found to have potential for pharmacist intervention. Given this, the pilot study will be expanded to determine the potential for pharmacist interventions on a more targeted sample of prescriptions written for patients discharged from the ED. Additionally, modalities to facilitate ED pharmacist prospective review of discharge prescriptions may be considered which include electronic health record builds to limit discharge prescription notifications to select drugs or drug classes.

Learning Objectives:

Review existing data related to pharmacist interventions on discharge prescriptions written from the emergency department.

Identify and categorize potential interventions pharmacists could make on discharge prescriptions written within the emergency department.

Self Assessment Questions:

Based on prior evidence, which medication classes have the highest potential for ED pharmacist intervention?

- A: Central nervous system agents
- B: Anti-infective agents
- C: Gastrointestinal agents
- D: All of the above

Based upon the presently described retrospective review, which medication class had the highest rate of potential pharmacist intervention?

- A: Fluoroquinolones
- B: Cephalosporins
- C: Antipsychotics
- D: Ulcer Drugs

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-777L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

THE IMPACT OF CLINICAL PHARMACY SPECIALISTS ON A1C REDUCTION IN A VETERAN POPULATION

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Within the Veteran Affairs (VA) Health System, there is an incidence of diabetes of about 1 in every 4 veterans. Clinical pharmacy specialists within the VA system play an integral role in helping manage this expanding patient population and many studies prove pharmacists positively impact direct patient care. Recently, the Dayton VA Medical Center (VAMC) began utilizing clinical pharmacy specialists in primary care. Prior to this, patients with diabetes were solely managed by their primary care physician or referred to the medicine-run diabetes clinic.

The purpose of this study is to evaluate the impact of PACT clinical pharmacy specialists within the Dayton VAMC. The primary outcome will assess HbA1c reduction at 12 months in patients referred to a clinical pharmacy specialist or the medicine-run diabetes clinic. Secondary outcomes include HbA1c reduction at 6 months and percentage of patients with an HbA1c of <8% at 12 months. Additionally, medications for cardiovascular and renal protection will be assessed. The results of this study will be used to evaluate the need for additional clinical pharmacy specialist positions in PACT clinics. This retrospective analysis evaluated patients that had a diabetes consult placed for either clinic between September 1, 2015 and March 31, 2016. Patients had to be at least 18 years of age with a diagnosis of type 2 diabetes mellitus (T2DM), have a baseline HbA1c of 8% or greater, and have clinic follow-ups for 12 months. Preliminary results show a HbA1c reduction of 1.24% and 0.80% at 12 months for patients referred to a clinical pharmacy specialist and the medicine-run diabetes clinic, respectively. Additionally, 45.8% of patients in the clinical pharmacy specialist group compared to 23.1% in the medicine-run diabetes clinic had a HbA1c <8% at 12 months. Complete results and conclusions will be presented at the Great Lakes Pharmacy Residents Conference.

Learning Objectives:

Identify risk factors for type 2 diabetes mellitus within the Veteran population

Recognize appropriate treatment goals for a patient with type 2 diabetes mellitus

Self Assessment Questions:

Which of the following is a risk factor associated with type 2 DM diabetes seen within the Veteran population?

- A: Young age
- B: Agent Orange exposure
- C: White ethnicity
- D: Underweight

According to the 2014 ADA guidelines, a patient with advanced microvascular complications should have what HbA1c target?

- A: <6.5%
- B: <7%
- C: <7.5%
- D: <8%

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-381L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PHARMACIST ADDITION TO THE STROKE TEAM: EVALUATION OF THE TIME TO INTRAVENOUS THROMBOLYTIC THERAPY FOR ACUTE ISCHEMIC STROKE WITH AND WITHOUT A PHARMACIST ON THE STROKE RESPONSE TEAM (PHAST TRIAL)

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Purpose: In the United States, acute ischemic stroke (AIS) is the fifth leading cause of death and leading cause of disability. The mainstay of early treatment of AIS is thrombolysis with tissue-type plasminogen activator, or tPA. It has been found to improve functional outcomes at 3 6 months when administered within 3 hours of stroke onset and can be used up to 4.5 hours after stroke onset in certain subpopulations. The American Heart Association/American Stroke Association (AHA/ASA) guidelines recommend a goal of administering tPA within 60 minutes of the patient's arrival in the emergency department. Prior studies have demonstrated the benefit of including a pharmacist on the stroke response team. The purpose of this study is to evaluate the impact of a pharmacist's involvement in the stroke team and to determine if it improves AIS management. **Methods:** There were two arms of the study: stroke calls where a pharmacist is not present on the stroke response team and stroke calls where the pharmacist responded with the team. The control arm is the current standard of care at Borgess. In the intervention arm, a pharmacist responded with the stroke team and compounded tPA at the bedside if the patient was eligible for the treatment. Pharmacist involvement on the stroke response team began January 2nd, 2017 and retrospective data was collected on patients activating the stroke response from January 1st - December 31st, 2016. Data for both arms were collected retrospectively through chart reviews and data recorded by the stroke team. The primary outcome was to determine if a significant difference exists in time-to-tPA between management of AIS with a pharmacist present on the stroke response team and without a pharmacist present. **Results and Conclusions:** Data collection is in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify the absolute exclusion criteria for tPA therapy

Define the role of a pharmacist on the stroke response team

Self Assessment Questions:

Which of the following is an absolute exclusion criterion for tPA therapy?

- A: Significant head trauma or prior stroke in previous 3 months
- B: Pregnancy
- C: Recent myocardial infarction (within the previous 3 months)
- D: Major surgery or serious trauma within previous 14 days

What was the role of the pharmacist on the stroke response team?

- A: To enter the electronic tPA order
- B: To determine if the patient is eligible for tPA therapy
- C: To compound the tPA at bedside
- D: To administer the tPA

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-389L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

OUTCOMES OF AN INPATIENT PHARMACIST-LED DISCHARGE INTERVENTION ON MEDICATION-RELATED PROBLEMS POST-DISCHARGE

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Purpose: Pharmacist involvement in transitional care management of patients has led to decreased medication discrepancies post-discharge, improved communication among health care providers, and reduced hospital readmission rates due to medication events. While pharmacists contribute to patient transition from hospital to home, the role pharmacists assume in this area is not well-defined. Currently, Good Samaritan TriHealth Hospital has no formal process for pharmacists to evaluate changes in a patient's medications before discharge. The purpose of this study is to evaluate the impact of an inpatient pharmacist-led discharge intervention on the incidence of medication-related problems post-discharge. **Methods:** Patients at high risk for readmission were identified for inclusion in this prospective study. High-risk patients are defined as those meeting any of the following criteria: 1) discharged on 3 or more new medications; 2) discharged on a new high-alert medication; 3) admitted for treatment of uncontrolled symptoms of 2 or more of the following chronic disease states: diabetes mellitus (types 1 or 2), chronic heart failure, hypertension, or COPD; 4) admitted with 10 or more documented maintenance prescription or over-the-counter medications prior to admission (excluding nursing home patients). The study group will receive a pharmacist-led intervention prior to discharge consisting of a face-to-face interview aiming to assess barriers to medication adherence, provide medication education, and to create a patient-specific medication plan in collaboration with prescribers. The control group will receive the current nursing-driven standard of care prior to discharge. All patients will be evaluated for outcomes of medication-related problems via phone calls at 3, 14, and 30 days post-discharge. Other outcomes of consideration include severity of potential adverse effects and reduction in 30-day all-cause readmission rates. This study has been approved by the TriHealth Institutional Review Board.

Learning Objectives:

Discuss major obstacles in transitions of care within an urban, community hospital and how pharmacists can address them

Describe the pharmacist's role at hospital discharge and during follow-up in resolving medication-related problems

Self Assessment Questions:

Medication-related problems most often occur:

- A: When the patient has not seen a provider in over a year
- B: Within 30 days after the patient is discharged from the hospital
- C: When the patient visits their primary care physician at a 6-month follow-up
- D: 1 year after the patient is discharged from the hospital

Which of the following problems could a pharmacist most likely participate in resolving at hospital discharge?

- A: The patient states their nebulizer machine is broken
- B: The patient states food is "hard to come by", therefore they eat what they can
- C: The patient states they never received a prescription for atorvastatin
- D: The patient states they have limited transportation to doctor appointments

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-815L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PALATABILITY OF EFFERVESCENT VS STANDARD ORAL N-ACETYL-CYSTEINE: IS IT WORTH ALL THE FIZZ?

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Purpose: Acetaminophen overdose continues to be one of the most common medication exposures reported to the US Poison Control Centers. Standard n-acetylcysteine is known for its strong sulfur taste and smell, which makes oral administration challenging in the setting of acetaminophen overdose. Recently, the Food and Drug Administration approved a flavored, effervescent n-acetylcysteine tablet for the treatment of acetaminophen poisoning. A palatability study will determine how this product compares to standard oral n-acetylcysteine diluted in different beverages. **Methods:** This is a prospective, cross-over, palatability study. Up to 55 healthy volunteers will be enrolled to ensure that 45 participants complete the study. Informed consent will be obtained prior to study participation. Subjects will participate in three separate sessions: one session will be dedicated to tasting effervescent n-acetylcysteine in water and effervescent n-acetylcysteine in lemonade one to tasting standard n-acetylcysteine in Fresca, standard n-acetylcysteine in Coca-Cola, and standard n-acetylcysteine in cranberry juice; and one session for smelling all of the product mixtures. Each session will be conducted on separate days. For tasting sessions, ten milliliters of the solution will be placed in an opaque cup with lid and straw. Participants will be asked to sample enough of each mixture to evaluate the taste and score the palatability using a visual analog scale with zero being least offensive and ten being most offensive. For smelling sessions, the solutions will be placed in glass beakers that have been covered with paper to de-identify each solution. After smelling each mixture, the subject will score the smell using a visual analog scale. Data collection will include visual analog scale scores from all sessions and be managed using the secure data system RedCap. Data analysis will be completed using Friedman ANOVA and Wilcoxon signed rank test. **Results and Conclusions:** Data collection and analysis is ongoing. Results and Conclusions to be presented at the Great Lakes Residency Conference.

Learning Objectives:

Discuss barriers to treatment of acetaminophen overdose with n-acetylcysteine such as palatability.
Review potential strategies to mitigate the poor palatability of n-acetylcysteine.

Self Assessment Questions:

What gives n-acetylcysteine its famously poor odor and taste?

- A It is a thiol compound, which contains a sulfhydryl group.
- B: Bad odor and taste is a sign the product is expired.
- C: The diluent reacts with the medication to produce the odor and taste.
- D: It is an ester compound, which contains an alkyl group.

In a previous study comparing the palatability of different n-acetylcysteine-beverage mixtures, what was the most preferred beverage to increase the palatability of n-acetylcysteine?

- A Chocolate milk
- B Fresca
- C Coca-Cola
- D Cranberry juice

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-406L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION AND EVALUATION OF A MULTIMODAL ALCOHOL WITHDRAWAL PROTOCOL

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Purpose: Patients with alcohol use disorders admitted to the hospital must be managed for the possibility of alcohol withdrawal syndrome. The mortality rate associated with alcohol withdrawal syndrome makes it of high importance if caring for one of these patients. Currently, there is not a standardized practice for managing these patients leading to inconsistent care during their hospitalization. The purpose of this study is to implement and evaluate a multimodal approach to alcohol withdrawal utilizing a more aggressive protocol that incorporates early pharmacotherapy with alternative mechanisms of action. **Methods:** This study will be a retrospective chart review evaluating patients who have been enrolled in the alcohol withdrawal protocol before and after the implementation of the new multimodal alcohol withdrawal protocol. The intervention arm will include changes to the protocol which involve initiating additional pharmacologic therapies earlier in the protocol as well as education of hospital staff on the best practices for medical management of alcohol withdrawal. The primary outcome of this study will be time to symptom control based on assessments with the Clinical Institute Withdrawal Assessment of Alcohol Scale, Revised. Secondary outcomes include hospital length of stay, duration of alcohol withdrawal, cumulative benzodiazepine doses, incidence of adjunct therapy use, rates of intubation, and adverse event rates. To be included in the study patients must be enrolled in the alcohol withdrawal protocol, exhibit symptoms of withdrawal, and be over the age of eighteen. **Results/Conclusion:** Initial results and conclusions will be presented at the 2017 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify which patient factors would indicate a more aggressive approach to treating their alcohol withdrawal.

Discuss the pharmacologic therapies available for treating a patient undergoing alcohol withdrawal.

Self Assessment Questions:

Which of the following patient factors may warrant more aggressive approach to treating alcohol withdrawal?

- A History of delirium tremens
- B: History of hypertension
- C: Advanced age
- D: Liver dysfunction

Which of the following therapies is the mainstay of alcohol withdrawal treatment?

- A Benzodiazepines
- B Haloperidol
- C Dexmedetomidine
- D Phenobarbital

Q1 Answer: A Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-420L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF ACCURACY AND COMPLETENESS OF CURRENT EMERGENCY DEPARTMENT MEDICATION HISTORIES

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Purpose: Obtaining accurate and up-to-date medication histories is at the forefront of proper patient care. Comprehensive medication histories provide practitioners the necessary information needed to adequately assess, evaluate, and treat patients. Patients are the most vulnerable during care transitions and are put at risk for medication errors due to poor communication and inadvertent information loss. The objective of this study is to determine the accuracy and completeness of the medication histories performed by nursing staff in the emergency department as compared to pharmacy staff. The goals are to improve overall patient safety, increase accuracy of medication histories, and to improve care transitions. **Methods:** This quasi-experimental pre-post quality improvement study (n=150) is being performed on patients presenting to the emergency department in which a medication history is completed by nursing staff. Pharmacists will perform follow-up medication histories on these patients to verify the accuracy of the nurse obtained medication histories and to identify discrepancies. Patients will be included if they present to the emergency department and are ≥ 18 years old. Exclusion criteria include: pregnant, non-English speaking, or behavioral health patients, patients impaired by drugs and/or alcohol, and patients with no home medications prior to admission. The primary outcome is the percentage of patients with medication/allergy discrepancies identified in their medication histories. Secondary outcomes include: average number of medications per patient, average number of discrepancies identified in the medication history per patient, average number of discrepancies involving high-risk medications, total number of discrepancies in each category, and average amount of time pharmacists spent collecting the medication histories. A 95% confidence interval for overall error rate of 7.3% will be used to compare the pharmacist vs. nurse assessments. **Results:** Results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain the importance and implications of obtaining a "Best Possible Medication History" (BPMH).

Describe strategies that can be used to reduce errors being made when completing medication histories.

Self Assessment Questions:

According to the World Health Organization (WHO), up to what percent of patients medication histories have one or more errors?

- A: 55%
- B: 40%
- C: 74%
- D: 67%

What is the optimal way to obtain pertinent medication history information from patients?

- A: Ask questions using close-ended interviewing techniques
- B: Ask questions using open-ended interviewing techniques
- C: Utilize only one source to obtain the medication information
- D: Record last dose taken for scheduled medications only

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-962L05-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF GLP-1 AGONISTS ON A1C LOWERING AT EDWARD HINES, JR. VA HOSPITAL

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Purpose: The American Diabetes Association recommends metformin as preferred the initial pharmacological agent for type 2 diabetes. If the A1C target is not reached with metformin monotherapy, combination therapy with sulfonylureas, thiazolidinediones, dipeptidyl peptidase IV (DPP-4) inhibitors, sodium-glucose cotransporter 2 (SGLT-2) inhibitors, glucagon-like peptide 1 (GLP-1) receptor agonists, or basal insulin may be considered. Therapy is based on patient-specific characteristics, with prescribers choosing DPP-4 inhibitors and GLP-1 receptor agonists as alternatives. At the Edward Hines Jr. VA Hospital, a pharmacy prior authorization drug request (PADR) must be approved by a pharmacist in order to initiate DPP-4 inhibitor and GLP-1 receptor agonist therapy. DPP-4 inhibitors include saxagliptin (on VA National Formulary), sitagliptin, alogliptin, and linagliptin. GLP-1 agonists include exenatide, liraglutide, albiglutide, and dulaglutide. The primary objective of this quality assurance and improvement (QA/QI) project is to assess the use, safety, and efficacy of GLP-1 receptor agonists. **Methods:** The MUE will utilize a retrospective database extraction to generate a list of patients on GLP-1 receptor agonists in the 2015 and 2016 calendar year. The computerized patient record system (CPRS) will be used to perform chart review. Data to be collected includes patient demographics, changes in antidiabetic agents after the addition of the study drugs, name and dose of study drugs, if the study drugs were started outside of the VA, concomitant insulin use, outpatient refill history, adverse drug reactions to diabetic agents, past medical history of heart failure and pancreatitis, and monitoring of HgbA1C, SCr, height, and weight. The data collected will be compared to a group of Veterans receiving DPP-4 inhibitors. This data was previously collected as part of the VISN12 DPP-4 inhibitor MUE in 2016. **Results:** Results and conclusions will be presented at the 2016 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the mechanism of action of GLP-1 agonists.

Discuss the potential advantages and disadvantages of GLP-1 agonist therapy.

Self Assessment Questions:

Which of the following describes one mechanism of action of GLP-1 agonists?

- A: Stimulates glucose-dependent insulin release.
- B: Accelerates gastric emptying.
- C: Promotes post-meal glucagon release.
- D: Inhibits the metabolism of DPP-4.

Which of the following is a potential disadvantage of GLP-1 agonist therapy?

- A: Potential weight gain and promotion of increased caloric intake.
- B: Established evidence demonstrating an increase in cardiovascular
- C: Contraindicated in patients with creatinine clearance below 60 mL
- D: Injectable medication may decrease adherence.

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-315L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

A CONVERSION OF FORMULARY CRITERIA ELIGIBLE PATIENTS ENROLLED IN A VETERANS AFFAIRS WARFARIN CLINIC TO TARGET SPECIFIC ORAL ANTICOAGULANT (TSOAC) THERAPY

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Purpose of the Research: To examine patients enrolled in the Huntington Veterans Affairs Medical Center (HVAMC) Warfarin Clinic in the past year to determine patients meeting national VA criteria for conversion from warfarin to a TSOAC, to determine benefit of conversion and examine the economic impact of conversion of eligible patients to TSOACs. **Methods:** A retrospective chart review will be performed on patients currently receiving long-term anticoagulation therapy through the HVAMCs anticoagulation clinic (considered ≥ 3 months). Available monitoring parameters (i.e., international normalized ratio (INR), hemoglobin, serum creatinine (SCr), creatinine clearance (CrCl), aspartate aminotransferase (AST), alanine aminotransferase (ALT), and pregnancy tests) will be reviewed to determine eligibility for possible conversion to a TSOAC agent based on the Veterans Affairs Pharmacy Benefit Managers criteria for use. Furthermore, patients currently receiving a TSOAC agent will be reassessed to ensure that patients continue to meet the current inclusion and exclusion criteria for TSOAC therapy. **Results:** Data is currently being collected and analyzed. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review indications and special considerations of use for target specific oral anticoagulants.

Discuss benefits and limitations of therapy in regards to transition eligible warfarin patients to a target specific oral anticoagulant.

Self Assessment Questions:

According to the Eliquis prescribing information, which of the following characteristics should you consider when initiating a dose?

- A Age ≥ 75 years
- B: Body weight ≤ 60 kg
- C: Serum creatinine ≥ 1.4 mg/dL
- D: Creatinine clearance < 30 mL/min

A 65 year old male with type 2 diabetes, hyperlipidemia, hypertension, gout, COPD and depression was recently diagnosed with atrial fibrillation. Due to his high level of pill burden and long commute

- A Warfarin
- B Apixaban
- C Dabigatran
- D Rivaroxaban

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-454L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

INCIDENCE OF POSTOPERATIVE VENOUS THROMBOEMBOLISM (VTE) AT THE UNIVERSITY OF ILLINOIS HOSPITAL AFTER IMPLEMENTATION OF PROPHYLACTIC ORDER SET

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Purpose: In April of 2016, University of Illinois Hospital (UIH) implemented a deep vein thrombosis (DVT) prophylaxis order set with the goal of reducing incidence of postoperative DVTs and (pulmonary emboli) PEs. The order set included 4 components with 1 assessment and 3 orders: DVT risk assessment, mobility order, pharmacologic prophylaxis order, and mechanical prophylaxis order. This study is needed to evaluate the efficacy of the implemented DVT prophylaxis order set for postoperative patients at UIH and identify other potential areas for improvement to further decrease the rate of postoperative DVT/PE. **Methods:** This study will be a retrospective, cohort study comparing the incidence of post-operative DVT or PE before and after the implementation of DVT prophylaxis order set and evaluating the compliance of 3 forms of thromboprophylaxis regimen before and after the implementation of the order set. The current study will collect data beginning April 2016 because data prior to April 2016 has already been collected. Postoperative patients over the age of 18 with venous thromboembolism (VTE) will be included and will be identified based on the Agency for Healthcare Research and Quality Patient Safety Indicator 12: Perioperative Pulmonary Embolism or Deep Vein Thrombosis Rate, which is provided by Vizient (formerly known as University HealthSystem Consortium, UHC) quarterly. Prisoners will be excluded. Data collection will include demographic data, risk factors for VTE, and thromboprophylaxis regimen. **Results/conclusions:** Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference pending data collection and analysis.

Learning Objectives:

Identify risk factors for VTE.

Describe an appropriate thromboprophylaxis regimen.

Self Assessment Questions:

Which of the following is a risk factor for VTE?

- A Patient is a non-smoker.
- B: Patient is pregnant.
- C: Patient did not receive fresh frozen plasma during surgery.
- D: Patient has no prior VTE.

If a patient is ineligible for pharmacologic VTE prophylaxis, mechanical prophylaxis should be avoided.

- A True
- B False
- C x
- D x

Q1 Answer: B Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-704L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF BROAD SPECTRUM ANTIBIOTIC USE FOR SKIN AND SOFT TISSUE INFECTIONS BEFORE AND AFTER INPATIENT ANTIMICROBIAL STEWARDSHIP INTERVENTIONS

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Purpose: The Infectious Diseases Society of America (IDSA) released guidelines for skin and soft tissue infections (SSTIs) in 2014. Previous studies have shown there is opportunity for antimicrobial stewardship with SSTIs due to inappropriate broad spectrum antibiotic use and that evidence-based treatment algorithms may help to reduce use and costs. The antimicrobial management team (AMT) processes within the Mayo Clinic Health System (MCHS) are still being refined. It is important to evaluate the use of broad spectrum antibiotics and the effect of the AMT interventions in order to help reduce antibiotic resistance, hospital acquired infections, and healthcare costs, as well as improve patient outcomes. The primary research question for this study is: Did the number of days on broad spectrum antibiotic therapy for SSTIs decrease after implementation of inpatient AMT interventions? This study will help to determine how large of an issue inappropriate broad spectrum agent use is for SSTIs and whether evidence-based guidelines are being utilized by providers. This study will help to determine the impact of the AMT interventions. This study will also help to determine specific areas the antimicrobial stewardship care can improve across the MCHS. **Methods:** This study is an Institutional Review Board approved study. A retrospective chart review was completed to compare SSTI patients admitted prior to and after the implementation of the AMT focused SSTI interventions, and physician education. Patients will be obtained using SSTI ICD-9 and 10 diagnosis codes. The primary outcome is length of broad spectrum antibiotic therapy. Secondary outcomes include total days on antibiotic therapy, treatment failures (30-day readmission or outpatient antibiotic treatment within 30 days of discharge), Clostridium difficile infection rates, and cost per antibiotic treatment per patient. **Results/Conclusions:** To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe antibiotic treatment options for nonpurulent and purulent skin and soft tissue infections based on infection severity
Recognize patient and disease characteristics that may change antibiotic choice

Self Assessment Questions:

What intravenous antibiotic would you recommend for moderate nonpurulent cellulitis?

- A: Clindamycin
- B: Piperacillin/tazobactam
- C: Cefazolin
- D: Azithromycin

Which patient scenario would warrant the use of broad spectrum antibiotics?

- A: Nonpurulent cellulitis, WBC > 12000/mm³, temperature > 38°C, hy
- B: Nonpurulent cellulitis, WBC > 12000/mm³, true penicillin allergy
- C: Purulent cellulitis, WBC > 12000/mm³, suspected MSSA infection
- D: Purulent cellulitis, streptococcal coverage needed, absence of abs

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-343L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EFFECTIVENESS, SAFETY, AND ECONOMIC COMPARISON OF INHALED FLOLAN AND INHALED VELETRI IN CARDIOTHORACIC SURGERY PATIENTS

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Purpose: Inhaled epoprostenol is a prostacyclin with antithrombotic, antiproliferative, and anti-inflammatory properties, making it an ideal pulmonary vasodilator. Differences in brand product formulation raises concern when deciding between Flolan and Veletri therapies. An example is the arginine component of Veletri, which historically resulted in poor patient outcomes when inhaled. A previously published study showed no difference in the PaO₂/FiO₂ ratio one hour after initiation between Flolan or Veletri (P = 0.54). Differences noted in their secondary outcomes were likely due to differences in this study's baseline characteristics. The purpose of this project is to evaluate a formulary conversion from Flolan to Veletri to determine if there is a difference in the effectiveness, safety, or cost when used in mechanically ventilated cardiothoracic surgery patients. By focusing on cardiothoracic surgery patients, we hope to isolate the true difference in effects of inhaled epoprostenol formulations. **Objectives:** The primary objective is to evaluate the change in the PaO₂/FiO₂ ratio after one hour of inhaled Flolan in comparison to inhaled Veletri. Secondary objectives include differences in ventilatory support, hemodynamic variables, intensive care unit (ICU) and hospital length of stay, hospital mortality, adverse effects, and medication average wholesale costs per patient. **Methods:** This is retrospective, noninferiority study performed at a single, large academic medical center. Included subjects will be ≥ 18 years old, who were admitted to the cardiothoracic ICU at Cleveland Clinic and received inhaled Flolan or inhaled Veletri therapy for ≥ 1 hour while mechanically ventilated between January 1, 2015 to December 1, 2016. Power was determined using a one-sided test of noninferiority and an alpha of 0.025. A total of 232 patients are needed to achieve 80% power to detect the noninferiority margin. Statistical tests and subgroup analyses will be performed as appropriate. **Results and Conclusions:** To be presented at Great Lakes Pharmacy Resident Conference

Learning Objectives:

Describe the role of inhaled epoprostenol in cardiothoracic surgery patients
Identify differences between inhaled Flolan and inhaled Veletri

Self Assessment Questions:

Which of the following is false regarding inhaled epoprostenol?

- A: The inhaled route has reduced systemic effects due to local action
- B: Inhalation is not an FDA approved route for either epoprostenol products
- C: Inhaled epoprostenol is dosed continuously or once every two hours
- D: Hypotension is an adverse reaction of epoprostenol due to direct vasodilation

How does inhaled Veletri differ from inhaled Flolan?

- A: Inhaled Veletri has extended stability compared to inhaled Flolan
- B: According to previous studies, inhaled Veletri is more effective in improving oxygenation
- C: Inhaled Veletri's diluent contains arginine, while inhaled Flolan's diluent does not
- D: A and C

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-451L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ADHERENCE TO NATIONAL GUIDELINES FOR THE MANAGEMENT OF ASYMPTOMATIC BACTERIURIA AND SKIN AND SOFT TISSUE INFECTIONS IN THE EMERGENCY DEPARTMENT

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Purpose: The Centers for Disease Control and Prevention (CDC) estimates approximately 20-50% of antimicrobial use in US acute care hospitals is inappropriate or unnecessary. One of the most common reasons for unnecessary antimicrobial use is asymptomatic bacteriuria with an estimated 45-65% of patients receiving inappropriate therapy. Urinary tract infections account for more than 1 million ED visits annually and there has been a 3-fold increase in ED visits for skin and soft tissue infections (SSTIs) in the past two decades. Data from an adult emergency department (ED) found that 59.86% of antimicrobial therapy did not comply with current guidelines. Unintended consequences of antimicrobial misuse include the development of resistance, adverse effects, and superinfection. There are two antimicrobial stewardship opportunities for improvement in the ED that have been identified via prospective pharmacist culture review and callback: asymptomatic bacteriuria (ASB) and purulent SSTIs. The aim of this study is to assess adherence to guideline recommendations by evaluation of the comprehensive management of patients being seen in the ED for asymptomatic bacteriuria and purulent SSTIs. **Methods:** This single-center, retrospective, descriptive analysis evaluated patients with urine or SSTI cultures that were discharged from the ED without hospital admission at Advocate Lutheran General Hospital. Culture reports were identified via ACL laboratories and TheraDoc for SSTIs between January 2015 and December 2016 and urine between January 2016 and December 2016. The primary objective was to assess adherence to IDSA guidelines for asymptomatic bacteriuria and mild, purulent SSTIs including appropriateness of cultures and antimicrobial therapy for patients in the ED without hospital admission. The secondary objective was to identify antimicrobial stewardship opportunities for improvement and develop initiatives for implementation to reduce unnecessary cultures and antimicrobial therapy. **Results/Conclusions:** Data collection and analysis are pending and will be presented at the Great Lakes Pharmacy Resident Conference in April 2017.

Learning Objectives:

List the indications requiring antimicrobial therapy for asymptomatic bacteriuria

Discuss treatment plan appropriateness for patients with mild, purulent skin and soft tissue infections in accordance with the 2014 IDSA SSTI guidelines

Self Assessment Questions:

A 63 year old post-menopausal female with no past medical history or allergies presents to the ED with epigastric pain that started 3 hours ago. She denies all other symptoms. The patient is stable and

- A: Ciprofloxacin is a reasonable empiric antimicrobial for acute uncor
- B: Recommend cephalexin as an alternative to ciprofloxacin due to it
- C: Despite having asymptomatic bacteriuria, the patient requires treat
- D: Avoid antimicrobials as the patient has asymptomatic bacteriuria

A 26 year old male presents to the ED with a furuncle on the back of his neck. The patient reports no past medical history and has never had a SSTI. He denies drug allergies. Labs are ordered, complet

- A: Sulfamethoxazole/trimethoprim Q12h X7 days with provider follow
- B: Cancel the culture and discharge the patient without antimicrobials
- C: Empiric sulfamethoxazole/trimethoprim Q12h for MRSA and cepha
- D: Hospital admission for IV vancomycin until culture results are avai

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-433L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF RISK FACTORS FOR ACUTE KIDNEY INJURY WITH VANCOMYCIN IN ADOLESCENT AND YOUNG ADULT CRITICALLY ILL PATIENTS

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Purpose: The use of vancomycin for treatment of gram positive infections in the intensive care units (ICU) across the country is very common. The use of this medication, like many others, comes with risks of adverse effects. Current literature has evaluated risk factors for pediatric populations and adult populations; however, the adolescent and young adult population has yet to be evaluated. This study aims to identify the incidence of acute kidney injury (AKI) and examine risk factors for the development of AKI in adolescents and young adults on vancomycin. **Methods:** We have conducted a retrospective review of electronic medical records to identify the incidence of vancomycin-associated acute kidney injury in patients 15-25 years of age who were on vancomycin, while admitted to an intensive care unit between July 1, 2014 and June 30, 2016. Acute kidney injury in this population was defined as an increase in serum creatinine by 0.5 mg/dL or 50% from baseline. In order to evaluate risk factors that could contribute to AKI, patients were compared in two separate arms; (1) patients who developed AKI and (2) patients who did not develop AKI. **Results:** Data collection is currently in progress and full results will be presented. **Conclusions:** Data collection is currently in progress and conclusion will be presented.

Learning Objectives:

Review current definitions of acute kidney injury.

Describe identified risk factors for developing vancomycin-associated acute kidney injury in critically-ill, pediatric and adult patients.

Self Assessment Questions:

What is the proposed mechanism renal tubular damage caused by vancomycin?

- A: Oxidative stress
- B: Manufacturing impurities
- C: Crystal formation
- D: Both B and C

Which of the following is independently associated with the development of vancomycin-induced nephrotoxicity in adults?

- A: Baseline kidney damage
- B: Prolonged duration of therapy
- C: Female gender
- D: Age greater than seventy years

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-616L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

RETROSPECTIVE EVALUATION OF CONTINUOUS RENAL REPLACEMENT PREMIXED SOLUTION UTILIZATION AND ASSOCIATED ELECTROLYTE REPLACEMENT

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Purpose: Continuous renal replacement therapy (CRRT) is a method of extracorporeal blood purification that is used for 24 hours per day and removes electrolytes and other low- and middle-molecular weight substances such as creatinine and urea from the blood. As a result, many CRRT patients develop serum electrolyte imbalances and require intravenous electrolyte replacement. Dialysate and replacement fluids (collectively referred to as dialysis solution) are physiologic electrolyte solutions that can further impact serum electrolytes. The purpose of this study is to evaluate the effect of dialysis solution electrolyte concentration and flow rate on electrolyte replacement requirements. **Methods:** This study was granted exempt status by the St. Elizabeth Institutional Review Board. A retrospective chart review of adult patients at St. Elizabeth Healthcare receiving CRRT for ≥ 24 hours between July 2015 and July 2016 was conducted and included 173 CRRT cycles. Patients were separated into 6 groups; 4 groups based on dialysis solution electrolyte concentration and flow rate and 2 groups based on regional citrate anticoagulation (RCA) and dialysate/replacement fluid rate. The primary outcome is the mean daily amount of potassium (K), calcium (Ca), phosphate (P) and magnesium (Mg) administered for replacement. **Results/Conclusion:** Preliminary data analysis suggests that patients on citrate anticoagulation require the most additional Mg supplementation. Patients in the group receiving solutions with a lower concentration of K at high flow required more K supplementation than the groups receiving higher K concentration solutions. All groups required Ca replacement and all groups except for one required P replacement. Solutions containing P and a higher concentration of Ca may be beneficial to this patient population. Patients on low-potassium dialysis solutions could be switched to higher potassium solutions after 24-36 hours. The combination of dialysis solution electrolyte concentration and rate affects electrolyte replacement requirements.

Learning Objectives:

Review the principles of continuous renal replacement therapy

Discuss the effect of dialysis solution electrolyte concentration and flow rate on electrolyte replacement needs

Self Assessment Questions:

Which of the following mechanisms of solute transport is/are involved in CVVHDF?

- A: Diffusion only
- B: Convection and Ultrafiltration
- C: Ultrafiltration and Diffusion
- D: Diffusion and Convection

Which of the following concentrations of calcium would be most appropriate in the dialysate of a patient receiving CVVHDF with regional citrate anticoagulation?

- A: 2.5 mEq/L
- B: 3.5 mEq/L
- C: 0 mEq/L
- D: 1.5 mEq/L

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-305L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

THE EFFECTS OF A STEPWISE IMPLEMENTATION OF PASSIVE AND ACTIVE CLINICAL DECISION SUPPORT METHODS FOR THE RENAL DOSING OF MEDICATION

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Purpose: Despite continuous advances in computerized provider order entry (CPOE), the full potential of clinical decision support (CDS) has not yet been realized. Customizing alerts via the analysis of real-time clinical data is one mechanism by which CDS actionability can be improved. Previously at Cleveland Clinic, custom functionality was built into the electronic medical record (EMR) that automatically adjusted default doses and frequencies based on renal function. In January 2017, the triggering logic for dose alerts was customized to allow for "High Dose" and "High Frequency" alerts to take renal function into account for 27 renally dosed medications. The purpose of this project is to provide a retrospective analysis and evaluation of this stepwise implementation of custom passive and active clinical decision support methods into the EMR at Cleveland Clinic. Additionally, this project may support the further refinement and expansion of CDS customization. **Methods:** This is a three-armed retrospective chart review that has been approved by the Institutional Review Board. Adult patients who were ordered one of the study medications in three distinct time periods: period 1 (Jan-Mar 2013), period 2 (Jan-Mar 2016), and period 3 (Jan-Mar 2017), will be included. The primary objective is to determine if these customizations have had an impact on the rate at which study medications are ordered in-line with institutional recommendations. Secondary objectives that will be evaluated are the rate at which alerts are triggered and the action taken after an alert is triggered (time period 3 only). The primary objective will be analyzed with both the chi square and chi square test for trend, continuous variables will be analyzed through a Student's t-test or Mann-Whitney U-test, while nominal data will use the chi-square or Fisher's exact test. **Results/conclusions:** Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the need for clinical decision support (CDS) customization pertinent to renal dose adjustment.

Identify the consequences of alert fatigue.

Self Assessment Questions:

Which of the following is true regarding renally dose adjusting medications and CDS pertinent to renal function?

- A: Few FDA approved medications require renal dose adjustment
- B: Few hospitalized patients have impaired renal function
- C: Few hospitalized patients are on medications that require renal dose adjustment
- D: Few CDS implementations are able to fully manage renal dose adjustment

Which of the following is a negative consequence of alert fatigue?

- A: Alerts are no longer triggered or displayed
- B: Clinically relevant alerts are often overridden
- C: Clinically irrelevant alerts are often overridden
- D: Alert fatigue does not have negative consequences

Q1 Answer: D Q2 Answer: B

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UTILIZATION OF A HIGH-COST REIMBURSEMENT TOOLKIT TO IDENTIFY STRATEGIES FOR IMPROVED REIMBURSEMENT FROM OUTPATIENT INFUSION SERVICES

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Purpose: As specialty medications continue to make up larger percentages of the annual drug spend for hospitals, proper reimbursement for these goods is essential. To ensure that hospitals are correctly billing for these items, Centers for Medicare and Medicaid Services (CMS) compiled a series of revenue and Healthcare Common Procedure Coding System (HCPCS) codes that direct the action of hospital billing departments. However, complexities in the billing process lead to misfiling of claims and subsequent denial of reimbursement. The High-Cost Drug Reimbursement Toolkit was established to assess billing practices at Pharmacy Systems Inc. hospitals, specifically for their outpatient infusion services. The study evaluated claims data from three Pharmacy Systems Inc. hospitals, looking to maximize reimbursement capture and increase the number of claims with reimbursement equal or greater to the purchase cost of the medication. **Methods:** A retrospective data review was performed on all claims related to the ten drugs with the highest drug expense at three Pharmacy Systems Inc. hospitals. Claims data for each hospital was collected over a three-month period. Claims were considered eligible if the drug was administered in an outpatient infusion clinic and had both retrievable charge and reimbursement data. Approval for the study was granted by the Pharmacy and Therapeutics Committee at each hospital. Additional review and approval of the ethical standards of this study was given by the OhioHealth Quality Assurance subcommittee. **Results:** Data collection is ongoing. Preliminary results to be presented at the Great Lakes Pharmacy Residency Conference in April 2017. **Conclusion:** The High-Cost Drug Reimbursement Toolkit potentially improves overall reimbursement on medications with the highest contributions to the outpatient infusion drug spend. Toolkit findings open up opportunities for collaboration between pharmacy and billing staff to increase education on proper billing procedures.

Learning Objectives:

Explain coding structures involved in outpatient infusion billing
Report differences in reimbursement rates based on HCPCS code availability and pass-through status

Self Assessment Questions:

Newer drugs and biologic agents with existing HCPCS codes, also called pass-through drugs, are typically reimbursed at what rate:

- A 95% of the AWP
- B: Percentage of billed charge
- C: Asp + 6%
- D: Wac + 3%

The most common Level II HCPCS codes assigned to non-orally administered and chemotherapy medications are referred to as:

- A CPT Codes
- B J codes
- C JW modifier codes
- D E codes

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-850L04-P

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PHARMACIST ASSISTANCE CHARACTERISTICS IN STROKE TREATMENT (PHARMACIST)

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Due to the time sensitive nature of an ischemic stroke, multidisciplinary responders are critical to make the process safe and efficient. Implementation of pharmacist stroke responders have been shown to be beneficial in the care of these patients. Typically, pharmacists aim to reduce medication-dosing errors, prevent thrombolytic administration to patients who are not appropriate candidates, and decrease the time to administration of medication therapy. To our knowledge, there have been no studies previously performed compiling information regarding institutional code stroke practices. The purpose of this study is to accumulate information from different institutions regarding stroke procedure processes. We hypothesized that the variance in methods for pharmacist stroke response and medication administration would be vastly different among institutions. This was a voluntary 10-15 minute online survey. Pharmacists included were part of the American College of Clinical Pharmacy (ACCP) Emergency Medicine (EMED) Practice and Research Network (PRN) listserv, the ACCP Critical Care (CC) PRN listserv, or a pharmacist member of the Neurocritical Care Society. Members were asked to anonymously answer potentially 44 questions regarding pharmacy response to acute ischemic strokes in the emergency department and inpatient units and thrombolytic preparation and administration. Participants excluded were hospital pharmacists that were not a part of these groups or were unable to provide the requested information. Data collected included basic demographic information, characteristics of pharmacist stroke responders, and preparation and mixture of thrombolytics. Data was analyzed using descriptive statistics. A total of 142 surveys were completed from 41 different states. Of these 50% were community hospitals, 42.2% were academic teaching hospitals, 4.9% were urban hospitals, and 2.8% qualified as other. Preliminary results yielded information from 45% primary stroke centers 43.6% comprehensive stroke centers, 7% acute stroke ready hospitals, and 3.5% uncategorized hospitals. Other data is currently pending evaluation.

Learning Objectives:

Describe key differences of pharmacist involvement in strokes
Discuss practice variances for code stroke among different hospital institutions

Self Assessment Questions:

In general, which of the following practices have pharmacists been shown to help improve in the setting of acute stroke?

- A Reduce medication dosing errors
- B: Prevent thrombolytic administration to patients who are not appropriate
- C: Decrease the time to administration of medication therapy
- D: All of the above

Which of the following is a contraindication for receiving thrombolytic therapy in the setting of acute stroke?

- A Diabetes
- B Prior hemorrhagic stroke
- C Platelets count of 125/mm3
- D Blood glucose of 80 mg/dL

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-688L01-P

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PRE-OPERATIVE MEDICATION MANAGEMENT AND INTERDISCIPLINARY COORDINATION

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Purpose: The perioperative setting requires careful coordination between patients, surgeons, anesthesiologists, primary care providers, registered nurses (RN), and pharmacists. The purpose of this project is to develop, implement, and evaluate clinical tools and workflows to improve pre-operative medication management and interdisciplinary coordination. The primary objective is to implement a delegation protocol in a surgical clinic which delegates authority to RNs to provide medication instructions to patients prior to planned surgical procedures based on clinical practice guideline recommendations. **Methods:** A perioperative medication management clinical practice guideline and associated delegation protocol for RNs were developed and approved. The clinical practice guideline and delegation protocol were vetted through physician, nursing, and pharmacy leadership. RNs within the delegation protocol pilot site, a pre-procedural anesthesia clinic (PASS Clinic), were shadowed to develop a process map for current workflow. An automated electronic medical record note was then developed to cross reference patients home medication regimens with the clinical practice guideline recommendations and develop a medication instruction sheet. A new workflow was then designed to integrate and support RN pre-operative medication management and instruction. The new workflow includes RNs driven medication histories, creating the medication instruction note, contacting prescribers as needed for medication guidance, and disseminating information to patients before discharging from the PASS Clinic. Outcomes measured will be percentage of completed medication instruction notes, rate of medication related surgical cancellations, and patient understanding of pre-operative medication management. **Preliminary Results:** Pharmacy technicians contacted 468 patients over a four week period and administered a five question survey to assess patient understanding of pre-operative medication management prior to the intervention. Ultimately, 94 (20%) patients reported receiving incomplete or no medication instruction and 225 (48%) patients received verbal information only. **Conclusions:** Final results and conclusions will be presented at the Great Lakes Resident Conference.

Learning Objectives:

Discuss barriers to the provision of medication instruction to patients prior to planned surgical procedures
Describe implementation strategies to help support pre-operative medication management within a surgical clinic

Self Assessment Questions:

Who can operate under the current pre-operative medication management delegation protocol at UW Health?

- A: All surgical clinic nurses
- B: Patients
- C: Pharmacy Technicians
- D: PASS Clinic Nurses

Which of these scenarios would exclude a patient from receiving medication instruction through the delegation protocol?

- A: Patients have 4 or more chronic conditions
- B: Patients are high risk for surgical or anesthesia complications
- C: Patients already received medication instructions from another provider
- D: Patients have 20 or more home medications

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-934L04-P

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EVALUATION OF ANTI-FACTOR XA CONCENTRATION WITH STANDARD THERAPEUTIC ENOXAPARIN DOSING IN PATIENTS WEIGHING AT LEAST 90 KG

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Purpose: Obesity results in pharmacokinetic and pharmacodynamic alterations for subcutaneously administered medications. Obese patients have variable serum anti-factor Xa concentrations (anti-Xa) and limited recommendations currently exist to guide dose adjustments.

Methods: This investigator initiated, retrospective, multicenter study evaluated patients admitted to a UC Health inpatient facility from November 2012 to September 2016. Subjects included were at least 18 years old, weighed at least 90 kg and received enoxaparin 1 mg/kg every 12 hours based on total body weight (TBW), and had a steady state peak anti-Xa collected. Subjects with a history of heparin induced thrombocytopenia, creatinine clearance (CrCl) less than 30 mL/min, total serum bilirubin 6.6 mg/dL or greater, and those who were pregnant or prisoners were excluded. Subjects with therapeutic and non-therapeutic anti-Xa were compared with a primary outcome of weight-based characteristics [TBW, body mass index (BMI), and body surface area (BSA)]. **Results:** 132 anti-Xa values met the inclusion criteria for this study. The therapeutic anti-Xa group had a lower TBW (115 kg vs. 124 kg, $p=0.029$) and BSA (2.38 m² vs. 2.45 m², $p=0.05$). TBW was higher in subjects with supratherapeutic anti-Xa when compared to subtherapeutic (126 kg vs. 114 kg, $p=0.044$) and to therapeutic (126 kg vs. 115 kg, $p=0.012$). BMI was also higher in subjects with supratherapeutic anti-Xa when compared to subtherapeutic (43.1 kg/m² vs. 34.3 kg/m², $p<0.001$) and to therapeutic (43.1 kg/m² vs. 39.2 kg/m², $p=0.006$). There was no difference in BSA between groups. Rates of acute bleeding was not statistically different for therapeutic vs. nontherapeutic anti-Xa nor between sub-, supra- or therapeutic anti-Xa. **Conclusion:** Multivariate analysis is in progress and results will be presented at Great Lakes.

Learning Objectives:

Discuss pharmacokinetic alterations of enoxaparin in obese patients.
Identify patients who are at risk for nontherapeutic anti-Xa concentrations while receiving 1 mg/kg enoxaparin.

Self Assessment Questions:

Previous published literature suggests that anti-Xa levels in obese patients receiving 1 mg/kg enoxaparin are:

- A: Subtherapeutic
- B: Therapeutic
- C: Supratherapeutic
- D: Unknown

Which of the following patients would benefit from having a peak anti-Xa level drawn?

- A: Patient with a BMI > 40 kg/m²
- B: Patient with an estimated creatinine clearance of 29 mL/min
- C: Patient with a history of GI bleed on anticoagulation
- D: All of the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-638L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
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IMPLEMENTATION OF A PROCESS TO ENSURE THE SAFE AND EFFICIENT USE OF CYTOTOXIC MEDICATIONS FOR NON-ONCOLOGIC INDICATIONS

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Purpose: The use of cytotoxic medications requires cautious prescribing, verifying, handling, and administering due to a narrow therapeutic index and the risk of toxicity. Norton Healthcare has developed and implemented computerized prescriber order entry (CPOE) order sets for cytotoxic medications when used for oncologic indications. Each order set contains details encompassing the entire medication use process for every member of the healthcare team to promote consistency, efficacy, and safety. Since cytotoxic medications are also used in non-oncologic indications, there is a need to develop specific order sets for these non-oncologic indications that incorporate those same principles. The purpose of this project is to create and implement a process that supports using CPOE order sets for the use of cytotoxic medications for non-oncologic indications. **Methods:** This project is a comprehensive quality improvement and patient safety initiative affecting all adult hospitals within the health system. Identification of cytotoxic medications used in the acute care setting for non-oncologic indications, a comprehensive literature review for evidence based practice, and engagement with key stakeholders of the medication use process serve as the foundation for this project. Development of the process involves accounting for each step in the medication use process with discipline specific focus, review and approval by leadership and end-user staff, and creation and delivery of education to ensure adherence with the new process. **Results and Conclusions:** Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the risks associated with the use of cytotoxic medications in each step of the medication use process.

Describe the benefits of implementing order sets that encompass the entire medication use process for cytotoxic medications.

Self Assessment Questions:

Which of the following scenarios minimizes the risk associated with cytotoxic medications?

- A: An ER physician contacts a pharmacist to give a verbal order for n
- B: A physician uses a handwritten order set and faxes it to the pharm
- C: An EMR cytotoxic medication order set is utilized to order cytotoxic
- D: A pharmacist transcribes a handwritten order for a cytotoxic medic

Standardization of cytotoxic medication ordering incorporates which of the following safety measures?

- A: Provides consistent ordering, preparation, and administration of cy
- B: Allows physicians to handwrite an order for a cytotoxic medication
- C: Minimizes communication between nurses and prescribers
- D: Permits nursing to time orders without input from pharmacy

Q1 Answer: C Q2 Answer: A

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THE IMPACT OF PHARMACISTS PROVIDING TRANSITION OF CARE PHONE CALLS IN A TRANSITIONAL CARE CLINIC

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Purpose: Transitions of care from the hospital to the primary care setting are important for optimal healthcare outcomes. Pharmacists have been shown to have a positive impact on patient care and prevent readmissions when they are involved in transitional care. This study evaluates the impact of a clinic-based pharmacist providing transition of care phone calls on patient outcomes. **Methods:** This is a retrospective study, designed to evaluate the impact of pharmacists intervention for patients in the Northwestern Medicine (NM) Transitional Care Clinic (TCC) post-discharge between November 2016 and February 2017. The pharmacist or pharmacy resident in the clinic will conduct a transition of care phone call within 48 hours (2 business days) to all patients discharged from NM who are referred to appointments at the TCC. Patients will be excluded if they have no working phone number, were discharged without medications, left against medical advice or were discharged to a skilled nursing facility. The patient phone call will assess: current medications, issues related to filling prescriptions, understanding medication indications and directions for use, adherence to the medication schedule, side effects, confirmation of TCC appointment, and other relevant clinical assessments. The primary endpoint of the study is the impact of pharmacists phone calls on no-show rates at the TCC. The data will be compared to the same time frame in the preceding year. Secondary endpoints include: hypothetical revenue generated if transitional care billing codes are utilized, number and type of interventions the pharmacist made, 30 day readmission rates, and number and type of medication errors found in patients reached during the pharmacists phone calls. **Results:** Data collection is currently in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe why no-show rates are detrimental to patient outcomes and identify potential ways to improve no-show rates in the outpatient setting. Identify the impact pharmacists performing transition of care phone calls can have on quality of care.

Self Assessment Questions:

No-shows in an outpatient clinic have the potential to negatively impact

- A: Patients' health outcomes that do not show to their appointment
- B: Provider's time and resources
- C: Other patient' health outcomes that are seen in the clinic
- D: All of the above

To meet Medicare's Transition of Care Management (TCM) Services criteria for billing, patients must receive an interactive contact within

- A: 7 business days of discharge
- B: 2 business days of discharge
- C: 3 days of discharge
- D: 14 days of discharge

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-896L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
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MEDICATION USE EVALUATION OF EFFICACY AND SAFETY OF TOCILIZUMAB IN PEDIATRICS

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Purpose: Tocilizumab, an IL-6 receptor inhibitor, is indicated for systemic juvenile idiopathic arthritis (sJIA) and polyarticular juvenile idiopathic arthritis (pJIA) for patients 2 years of age and greater. Tocilizumab has beneficial effect against grade 2, 3, 4 cytokine release syndrome (CRS), a life threatening toxicity related to CD19 chimeric antigen receptor (CAR) T cell therapy. The American College of Rheumatology (ACR) recommends tocilizumab use in refractory JIA. The primary objective of this study is to determine effectiveness and safety of tocilizumab use in pediatric patients. Secondary objective is to determine premedication requirement and average dosing for each indication. **Methods:** A retrospective chart review of tocilizumab use at a tertiary care pediatric hospital between January 2016 and October 2016 is conducted to assess efficacy and safety of tocilizumab in children age 2 to 18 years. Patient information was obtained through the hospital's electronic health record. Data includes patient demographics, baseline disease characteristics, previous exposure to biologics, treatment regimen, patient response to therapy, adverse events and premedication requirements. Descriptive statistics with categorical data represented as frequency is performed to analyze significance of the finding. Systemic literature review pertaining to labeled and unlabeled use in pediatrics has been completed as well. **Preliminary Results and Conclusions:** Total of 10 patients received tocilizumab within 10 months period. Patients with chronic disease had an average of 6 previous medication therapies over 5 years prior to tocilizumab. Four (40%) patients had off-labeled indications such as cytokine release syndrome (CRS), uveitis and vasculitis. More than 90% of doses were administered for patients under rheumatology service. Complete results and conclusion will be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Define mechanism of action of tocilizumab and its labeled and off-labeled use

Identify dosing regimen appropriate for pediatrics

Self Assessment Questions:

Which of the following is a correct combination of mechanism of action and indicated use of tocilizumab?

- A: TNF-alpha inhibitor, juvenile idiopathic arthritis
- B: IL-2 antagonist, cytokine release syndrome
- C: IL-6 antagonist, juvenile idiopathic arthritis
- D: TNF-alpha inhibitor, Crohn's disease and ulcerative colitis

Which of the following describes appropriate dosing by weight group?

- A: <30 kg: 10 – 12 mg/kg
- B: >40 kg: 5 – 10 mcg/kg
- C: <50 kg: 2 – 5 mg/kg
- D: >100 kg: 162 mg

Q1 Answer: C Q2 Answer: A

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IMPLEMENTATION OF A COMMUNITY PHARMACIST-RUN TRANSITION OF CARE PROGRAM FOR TRANSITION FROM POST-HOSPITALIZATION SKILLED NURSING FACILITY STAY TO HOME

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Purpose: The objective of this study is to assess the implementation of a community pharmacist led comprehensive transitions of care program for patients transitioning home after a post-hospitalization skilled nursing facility (SNF) stay in an effort to reduce hospital readmissions. **Methods:** A community pharmacist led transition of care service is offered to patients being discharged from community SNFs. Eligible patients have a primary care provider associated with the local hospital and plans for discharge to a home setting from the SNF within 30 days of discharge from the hospital. The comprehensive transition of care service consists of a comprehensive medication review appointment with the community pharmacist prior to discharge from the SNF, recommendations sent to the provider responsible for SNF discharge orders, and an updated hospital electronic medical record. Patients receive a discharge folder from the community pharmacy which includes medication instructions, an individualized patient health plan, and filled prescriptions as needed, with optional bubble packaging. The community pharmacist follows up with the patient after SNF discharge up to 30 days post-discharge from the hospital. Clinical efficacy will be evaluated through acceptance of provider recommendations and all-cause hospital readmissions determined through chart review. Implementation will be evaluated by rates of patient initial appointment and follow-up appointment completion, a program specific patient satisfaction survey, and interviews with pharmacists, SNF staff, and primary care providers to determine barriers and facilitators to program implementation. Descriptive statistics will be used to summarize quantitative outcomes and content analysis will be used for interviews and open ended questions. **Results/Conclusions:** Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify barriers to the implementation of a transitions of care program for community pharmacists in a long term care (LTC) patient population.

Describe the significance of pharmacists role in patient care transitions in a LTC setting.

Self Assessment Questions:

Which of the following is a barrier to the implementation of a transition of care service for patients discharging from a LTC setting?

- A: Lack of acceptance of service from LTC facility staff
- B: Lack of communication between the LTC facility, PCP, and community pharmacist
- C: Lack of acceptance of service from patients
- D: Lack of well-suited clinical training for pharmacists performing services

Which of the following is a benefit of pharmacy transition of care service for patients in a LTC setting?

- A: Services reach patients at lower-risk of readmission who are currently in LTC
- B: Increased community-pharmacist's independence for providing patient care
- C: Services potentially reach patients at highest risk of readmission
- D: Decreases community pharmacist's time requirement for recently discharged patients

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-731L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

A RETROSPECTIVE COMPARISON OF OUTCOMES BEFORE AND AFTER CHANGING FROM A WEIGHT-BASED TO A NON-WEIGHT BASED FENTANYL TITRATION PROTOCOL

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Purpose: Patients in the intensive care unit (ICU) often require mechanical ventilation for airway protection which necessitates the continuous infusions of sedatives and/or analgesics. Sedative medication doses have historically been studied and calculated based on the weight of the patient in kilograms (kg), and maximum dosages are also often expressed in this manner. However, as obesity continues to rise, there is increasing concern for adverse effects. A potential solution to preventing these adverse effects would be to consider non-weight based drips for sedation and/or analgesia. Currently, limited data exists comparing outcomes of weight-based versus non-weight based fentanyl protocols. **Methods:** A retrospective chart analysis was conducted examining patients on fentanyl drips in the intensive care unit (ICU) of a community teaching hospital before and after a change from weight-based to a non-weight based fentanyl titration protocol. Outcome measures include total fentanyl dose, average fentanyl drip rate, ICU length of stay (LOS), hospital LOS, time to successful extubation, average sedation score, and presence of delirium. **Results and Conclusion:** Data collection and analysis is pending. Results and conclusions to be presented upon completion of data analysis.

Learning Objectives:

List the potential risks associated with weight-based fentanyl dosing. Identify appropriate monitoring parameters for continuous fentanyl infusions.

Self Assessment Questions:

Which of the following is a risk associated with weight-based fentanyl dosing?

- A: Respiratory depression
- B: Over-sedation
- C: Increased time to successful extubation
- D: All of the above

What is an ideal SAS score range?

- A: 1-2
- B: 3-4
- C: 5-6
- D: 6-7

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-326L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
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DILTIAZEM VS. METOPROLOL IN THE ACUTE MANAGEMENT OF ATRIAL FIBRILLATION IN PATIENTS WITH HEART FAILURE WITH REDUCED EJECTION FRACTION

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Purpose: Atrial fibrillation (AF) is a common arrhythmia in patients with heart failure with reduced ejection fraction (HFrEF) and is frequently complicated by rapid ventricular response (RVR) that necessitates medical intervention. These patients can be treated acutely with diltiazem, a non-dihydropyridine calcium channel blocker (NDHP-CCB) or metoprolol, a beta blocker (BB). However, national guidelines recommend against NDHP-CCB use in patients with heart failure (HF) due to potential harm, although, this recommendation is based on studies with long-term treatment. Data regarding short term utilization of NDHP-CCB or BB in HFrEF for rate control in the acute setting of AF with RVR are lacking. Therefore, the objective of this study is to assess the difference between metoprolol and diltiazem for the acute treatment of AF with RVR in patients with HFrEF. **Methods:** A retrospective cohort study of patients with HFrEF in AF with RVR receiving either intravenous (IV) metoprolol or diltiazem was conducted between January 2012 and September 2016. Exclusion criteria included hypotension (systolic blood pressure <90 mmHg) and decompensated HF. The primary outcome was successful rate control within 30 minutes from the first IV dose, defined as a heart rate (HR) <100 bpm or a decrease by at least 20%. Secondary outcomes included: successful rate control within 15 and 60 minutes, incidence of hypotension, bradycardia (HR <60 bpm), or conversion to normal sinus rhythm within 30 minutes, and symptoms of worsening HF (new inotropic support, new pulmonary edema, or increased oxygen requirement within 48 hours or readmission within 7 days of discharge). **Results:** Results are pending. **Conclusion:** Conclusions are pending statistical analysis.

Learning Objectives:

Identify common risk factors for HF and AF.

Review available literature on utilization of diltiazem versus metoprolol in patients with AF in the acute setting, in general and specifically in those with HFrEF.

Self Assessment Questions:

Shared risk factors for heart failure and atrial fibrillation include:

- A: Age
- B: Diabetes mellitus
- C: Obesity
- D: All of the above

In prior studies investigating metoprolol vs diltiazem for AF with RVR management in the acute setting:

- A: Diltiazem is always more successful than metoprolol
- B: Metoprolol is always more successful than diltiazem
- C: There is no difference between metoprolol and diltiazem
- D: Results vary between studies

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-372L01-P

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USE OF CLONIDINE INITIATION AS ADJUNCTIVE THERAPY FOR ALCOHOL WITHDRAWAL IN THE EMERGENCY DEPARTMENT

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Purpose: Prolonged alcohol use leads to the development of physical dependence in which the brain undergoes changes to maintain neurotransmitter homeostasis. As a result, autonomic overactivity of the central nervous system (CNS) occurs in response to abrupt cessation of alcohol. Symptoms of alcohol withdrawal, including tachycardia, hypertension, agitation, seizures, hallucination, and delirium tremens, result from the sympathetic surge. Benzodiazepines are the treatment of choice in alcohol withdrawal. However, overuse of benzodiazepines can cause respiratory depression, ultimately leading to mechanical ventilation or intensive care unit (ICU) admission. Clonidine is a presynaptic alpha-2 agonist in the CNS that suppresses sympathetic outflow. Studies have shown adjunctive dexmedetomidine, another alpha-2 agonist, decreases benzodiazepine requirements in alcohol withdrawal. The purpose of the study is to evaluate effects of clonidine as adjunctive therapy to decrease benzodiazepine requirements in patients with alcohol withdrawal. **Methods:** This retrospective cohort study evaluated patients who presented to the Northwestern Memorial Hospital emergency department (ED) for alcohol withdrawal who are treated with clonidine as adjunctive therapy versus benzodiazepine monotherapy. Patients were excluded if he/she experienced trauma, received any adjunct agent other than clonidine, was discharged from the ED, or the primary diagnosis was not alcohol withdrawal. The primary endpoint is 12-hour cumulative benzodiazepine requirements in lorazepam equivalents in the clonidine cohort as compared to patients who receive benzodiazepine monotherapy. Secondary endpoints include continuation of clonidine after admission, cumulative daily doses and duration of clonidine, cumulative daily doses of benzodiazepines, length of ICU stay, length of hospital stay, incidence and duration of mechanical ventilation, and incidence of hypotension. **Results:** Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify the risks of overuse of benzodiazepine therapy and its impact on patients with alcohol withdrawal.

Describe the mechanism of action and rationale for use of clonidine as adjunctive therapy in alcohol withdrawal.

Self Assessment Questions:

Which of the following is/are potential side effect(s) of benzodiazepines?

- A: Respiratory depression
- B: Hypertension
- C: Sedation
- D: A and C

What is the proposed mechanism of action of clonidine in alcohol withdrawal?

- A: Antagonism at NMDA receptors in the brain decreasing neuronal excitability
- B: Agonist activity at alpha-2 receptors in the CNS decreasing autonomic outflow
- C: Agonist activity at GABA receptors augmenting benzodiazepine action
- D: Treatment of hypertension associated with alcohol withdrawal

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-532L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

CLINICAL OUTCOMES OF ANTIBIOTIC THERAPY FOR INDUCIBLE AMPC BETA-LACTAMASE-PRODUCING GRAM-NEGATIVE BACILLI IN HOSPITALIZED PEDIATRIC PATIENTS

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Purpose: There are limited data regarding the optimal treatment of bacterial infections caused by inducible AmpC beta-lactamase-producing gram-negative bacilli in pediatric patients. Due to the potential for high-level AmpC production within certain enteric gram-negative organisms, the development of resistance during therapy with third-generation cephalosporins or piperacillin/tazobactam is a concern. Several studies in adults have suggested the use of these agents should be avoided. At Rush University Medical Center, third-generation cephalosporins and piperacillin/tazobactam have been among the antibiotics used to treat infections caused by *Citrobacter*, *Enterobacter*, *Morganella*, and *Serratia* within the pediatric population. More research is needed to determine the clinical outcomes among antimicrobial treatment regimens in pediatric patients with infections caused by these organisms. The purpose of this study is to determine how the treatment of AmpC beta-lactamase-producing organisms with third-generation cephalosporins or piperacillin/tazobactam impacts pediatric outcomes and to identify optimal antibiotic selection. **Methods:** A single-center, retrospective, case cohort study including hospitalized pediatric patients ages 18 years and younger with bacterial infections caused by *Citrobacter*, *Enterobacter*, *Morganella*, and/or *Serratia* from April 2011 and April 2016 was performed. Those with polymicrobial infections, colonizing bacteria, or positive pregnancy tests were excluded. The primary objective was to compare the 28 day clinical cure rate between two cohorts: (1) patients treated with carbapenems, cefepime, fluoroquinolones, aminoglycosides, or sulfamethoxazole/trimethoprim versus (2) patients treated with piperacillin/tazobactam, cefotaxime, ceftazidime, or ceftriaxone. Secondary objectives included microbiologic cure within 14 days, mortality within 28 days, emergence of resistance within 6 months, re-infection within 6 months, and length of hospitalization. **Results:** Results pending. **Conclusion:** Conclusions pending results.

Learning Objectives:

Describe the mechanism of AmpC beta-lactamase production and its impact on the adult population.

Identify the effects of third-generation cephalosporins and piperacillin/tazobactam on the outcomes of pediatric patients with infections caused by AmpC beta-lactamase producing organisms.

Self Assessment Questions:

Which of the following organisms can be associated with chromosomal-mediated AmpC production?

- A: *Klebsiella pneumoniae*
- B: *Enterobacter cloacae*
- C: *Escherichia coli*
- D: *Pseudomonas aeruginosa*

Which of the following is a recommended treatment option for AmpC-producing organisms in adults?

- A: Ceftriaxone
- B: Cefotaxime
- C: Cefepime
- D: Ceftazidime

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-328L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF A PHARMACIST-LED CARDIOLOGY PHARMACOTHERAPY CLINIC ON CHRONIC HEART FAILURE MANAGEMENT

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Purpose: Heart failure (HF) is expected to impact a growing population in the United States. Management of heart failure reduced ejection fraction (HFrEF) includes therapies that can provide mortality benefit, reduce hospitalizations, and increase symptomatic relief. The purpose of this retrospective chart review is to identify the impact of a pharmacist-run cardiology pharmacotherapy clinic versus a general cardiology clinic on medication titration and outcomes during chronic HF management in a Veterans Affairs (VA) healthcare system. **Methods:** Patients with HFrEF who are New York Heart Association Functional Class II - IV and enrolled in the general cardiology or pharmacotherapy clinic from July 1, 2009 to September 7, 2016 will be included. Exclusion criteria will be defined as terminal illness, severe cognitive impairment, non-VA cardiology care, use of an investigational drug, residence at a nursing home, hospitalization in the last month, and less than six months of follow-up. Baseline characteristics will be collected for propensity weighting according to the Heart Failure Patient Severity Index (HFPSI), which predicts 6-month risk of death and all-cause hospitalization. The study will be powered to detect a difference in non-fatal HF events between clinics, which will be defined as emergency department visits or hospital admissions for HF exacerbation. In addition, titration of angiotensin-converting enzyme inhibitors (ACEIs), angiotensin II receptor blockers (ARBs), and beta-blockers to target doses as well as prescribing rates of aldosterone antagonists will be compared. Other secondary outcomes will include time to all-cause mortality; time to first lab after medication initiation or titration; use of adjunct therapies including digoxin, diuretics, and hydralazine/isosorbide dinitrate; medication adherence; and number of HF medication changes per visit. **Safety endpoints** will include angioedema, gynecomastia, symptomatic hypotension, syncope, renal dysfunction or impairment, hyperkalemia, asthma, chronic obstructive pulmonary disease, bradycardia, atrioventricular node block, and pacemaker implantation. **Results/Conclusion:** Data collection and analysis are ongoing.

Learning Objectives:

Recognize risk factors that may predict 6-month risk of death and all-cause hospitalization in patients with heart failure
Identify evidence-based therapies for the management of reduced ejection fraction heart failure

Self Assessment Questions:

Which of the following may increase risk of death or all-cause hospitalization according to the Heart Failure Patient Severity Index?

- A Diabetes
- B: NYHA Functional Class I
- C: Hospitalization within the last 6 months
- D: A and C

Which of the following classes of medications is strictly associated with symptomatic relief in reduced ejection fraction heart failure?

- A Angiotensin-converting enzyme inhibitors
- B Loop diuretics
- C Beta-blockers
- D Aldosterone antagonists

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-633L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

OPTIMIZATION OF AUTOMATED DISPENSING CABINETS TO ENHANCE OPERATIONAL EFFICIENCY AND CUSTOMER SERVICE

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Purpose: The purpose of this project is to achieve a stockout rate of less than 1% for each automated dispensing cabinet (ADC) and an average vend-to-fill ratio of greater than 11 for all ADCs evaluated. **Methods:** A workgroup composed of a pharmacy manager, ADC coordinator, central automation coordinator, and a pharmacy administrative resident was established. Standard workflows for new ADC setup and optimization were developed. Baseline stockout rates and vend-to-fill ratios were obtained for all ADCs, and an impact analysis was completed to prioritize optimization efforts. A virtual library of ADCs was compiled to identify opportunities for enhanced configurations. Velocity and inventory reports were evaluated to determine inventory that should be removed, modified or added. Institute for Medication Safe Practice guidelines on ADC configuration, and customer ergonomic preferences were utilized to construct optimized layouts. Interventions were implemented in phases based on priority assignment. The virtual library was continuously updated to reflect changes. A financial analysis was conducted to determine one time inventory savings on inventory removed from ADCs. A continuous improvement plan was established to identify future optimization efforts. **Summary/Conclusions:** Conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify strategies to prioritize automated dispensing cabinet optimization efforts

Recognize metrics to include when developing a continuous improvement plan to evaluate operational efficiency of automated dispensing cabinet configurations

Self Assessment Questions:

What is the best way to calculate vend-to-fill ratio for automated dispensing cabinets?

- A Number of nurse fills / number of pharmacy vends
- B: Number of nurse vends / number of pharmacy fills
- C: Number of physician vends / number of physician fills
- D: Number of pharmacy vends / number of nurse fills

All of the following are metrics that can be used to monitor automated dispensing cabinet optimization, except:

- A Vend-to-Fill Ratio
- B Stockout Rate
- C Inventory Cost Savings
- D Number of password resets

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-951L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EFFECT OF AN ELECTRONIC MEDICAL RECORD TOOL ON THE DOCUMENTATION AND MANAGEMENT OF NEWLY SUSPECTED HEPARIN INDUCED THROMBOCYTOPENIA

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Background: Heparin-induced thrombocytopenia (HIT) is an immune-mediated adverse drug reaction to heparin products. Heparin-induced thrombocytopenia generally occurs several days after the start of unfractionated or low molecular weight heparin and is diagnosed based on clinical presentation, and presence of thrombocytopenia. The incidence of HIT is 0.1% to 5% and if heparin products are withdrawn as soon as suspected, alternative treatments can be initiated which can help prevent major complications. With the implementation of an electronic medical record (EMR) tool in 2014, the responsibility of documenting appropriate heparin allergies shifted from the medical resident to the pharmacy resident. The purpose of this study is to assess the appropriateness of heparin allergy documentation and subsequent management of HIT after the EMR tool implementation and pharmacy resident involvement. **Purpose:** In November 2014, the pharmacy department developed an electronic medical record (EMR) tool to assist in the documentation and management of heparin-induced thrombocytopenia. The purpose of this study is to evaluate the effectiveness of this EMR tool. **Methods:** This is a single center, retrospective cohort, of inpatients at RUMC between January 1, 2014 and September 30, 2015. This study included patients greater than 18 years old with a HIT-Ab lab order. Patients were excluded if they had a previously confirmed HIT allergy, were pregnant, or were a transfer from an outside hospital to RUMC within 4T score assessment window. The primary endpoint of this study was to determine if the documentation of heparin allergy was appropriately performed. The secondary endpoints include, incidence of heparin administered to patients with a HIT-Ab pending, documentation of the 4T score in EMR, appropriateness of direct thrombin inhibitor use, and appropriateness of ordering serotonin release assay. **Results/Conclusion:** Data collection and analysis are ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review the utility of the 4T HIT Score, in the diagnosis of heparin induced thrombocytopenia

Discuss when it is appropriate to initiate a direct thrombin inhibitor in a patient with suspected HIT

Self Assessment Questions:

What patient characteristics are required to calculate a 4T score?

- A Thrombocytopenia, Timing of Hemoglobin Count Fall, Thrombin T
- B: Thrombocytosis, Timing of Platelet Count Increase, Thrombosis, and
- C: Thrombocytopenia, Timing of Platelet Count Fall, Thrombosis, and
- D: d.Total Triglycerides, Timing of Elevated Troponin, Elevated Troponin

With a pending HIT antibody lab order, when would it be most appropriate to start a direct thrombin inhibitor?

- A 4T Score of 3, receiving 40 mg enoxaparin daily in the medical ICU
- B 4T Score of 4, receiving a heparin infusion for a pulmonary embolism
- C 4T Score of 4, receiving 30 mg enoxaparin twice daily after a knee
- D 4T score of 5, receiving subcutaneous heparin 5000 units twice daily

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-950L05-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DEVELOPMENT AND IMPLEMENTATION OF CONSENSUS GUIDELINES FOR THE TREATMENT OF PROSTHETIC JOINT INFECTIONS ACROSS A MULTI-HOSPITAL HEALTH CARE SYSTEM

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Purpose: Prosthetic joint infection (PJI) is one of the most serious complications of joint replacement surgery. PJI has significant impact on quality of life, and often leads to prolonged exposure to antibiotics, additional surgeries for diagnosis and management, and increased cost of care. Aside from prevention, curing the infection with the first treatment attempt is crucial. Each treatment failure increases risk of tissue damage, bone loss and reduction in functional status. Published rates of PJI are roughly 1-2 percent following hip and knee replacement. Despite low rates, the impact of PJI on patient outcomes and the health care system is substantial. The objectives of this project are to describe baseline rates of PJI in a multi-hospital health care system, identify associated pathogens, develop and implement treatment guidelines for optimal management of PJI, and to establish a method to prospectively identify patients with PJI and actively apply recommendations to optimize antibiotic management. **Methods:** Numbers of infections and associated organisms were obtained retrospectively utilizing the standard definition for surgical site infections published by the Centers for Disease Control (CDC) National Healthcare Safety Network (NHSN). Utilizing published guidelines and primary literature, pathogen-directed treatment recommendations for PJI were prepared. Recommendations were reviewed by infectious diseases physicians and orthopedic surgeons. Clinical surveillance software was utilized to create a report to identify patients in the system with PJI in real time. Patients identified are then assessed for appropriate pathogen-directed treatment according to the treatment recommendations. **Results:** From January 2014 to March 2016, rates of PJI in the system were consistent with literature at 1.26% for hip PJI and 0.51% for knee PJI. The most commonly isolated organism was Staphylococcus aureus (43/133, 32.3%). Final results and conclusions will be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the impact of prosthetic joint infections on patients and the health care system.

Identify barriers to the successful treatment of prosthetic joint infections caused by methicillin-resistant Staphylococcus aureus.

Self Assessment Questions:

Which of the following statements is true regarding the impact of prosthetic joint infections on patients and/or the health care system?

- A Infections can be treated with a short course of antibiotics
- B: Hospital length of stay, health care costs, and burden on quality of
- C: Functional mobility is not affected by prosthetic joint infection
- D: Repeat surgeries are not often necessary in the management of p

Drug-drug interactions with which of the following medications is a barrier to the successful treatment of prosthetic joint infections caused by methicillin-resistant Staphylococcus aureus?

- A Rifampin
- B Vancomycin
- C Ciprofloxacin
- D Minocycline

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-397L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF ANTICOAGULANT USE IN PATIENTS WITH CHADS2 > 2 IN AN ACCOUNTABLE CARE ORGANIZATION

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Purpose: Patients with atrial fibrillation (AF) are at an increased risk of developing an ischemic stroke and account for 15 - 20% of all ischemic strokes each year. The 2014 AHA/ACC/HRS Guidelines for the Management of Patients with Atrial Fibrillation recommend that patients with AF be treated with therapeutic anticoagulation to minimize the risk of stroke and stroke complications. The CHADS2 and CHA2DS2-VASc scores were developed and validated to estimate the annual risk of stroke in patients with AF. The most recent guidelines endorse the use of the CHA2DS2-VASc score to guide treatment for stroke prevention, recommending all patients with a score of 2 or more receive therapeutic anticoagulation. The primary objective of this study is to evaluate anticoagulation prescribing in patients with AF stratified as high risk for stroke by a CHADS2 score of 2 or more within an accountable care organization. **Methods:** A retrospective single-center cohort design was utilized to identify patients > 18 years old with a diagnosis of AF and a CHADS2 score > 2 between November 1, 2014 and October 31, 2016. The electronic medical record was used to collect age, system-reported CHADS2 score, anticoagulant use, antiplatelet use, documented lack of anticoagulation, documented bleeding risk or history, and documented fall risk or history. Preliminary results: A total of 182 patients have been identified to date for inclusion. The average CHADS2 score was 3.3. Majority of patients receiving anticoagulation were on warfarin (39%). Four (2.2%) patients were on dabigatran, 39 (21.4%) patients were on apixaban, 13 (7.1%) patients were on rivaroxaban, and no patients are on edoxaban. The remaining 55 patients (30.2%) were not receiving any anticoagulation. **Conclusion:** Final results and conclusion will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss guideline recommendations for the prevention of stroke in patients with atrial fibrillation based on CHA2DS2-VASc score.
Explain how CHA2DS2-VASc score correlates with annual risk of stroke

Self Assessment Questions:

The 2014 ACC/AHA Guideline for Management of Patients with Atrial Fibrillation recommends anticoagulation for stroke prevention in patients with a CHA2DS2-VASc:

- A 0
- B: >= 1
- C: >= 2
- D: >= 3

Which of the following correlates with an annual stroke risk of 4%?

- A CHA2DS2-VASc score = 2
- B CHA2DS2-VASc score = 3
- C CHA2DS2-VASc score = 4
- D CHA2DS2-VASc score = 5

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-435L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

HEPARIN VERSUS BIVALIRUDIN IN PATIENTS WITH ACUTE CORONARY SYNDROME DURING PERCUTANEOUS CORONARY INTERVENTION

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Background: The most effective antithrombotic regimen for preventing ischemic complications while limiting bleeding risk in patients with an acute coronary syndrome (ACS) who are undergoing invasive treatment such as percutaneous coronary intervention (PCI) remains unknown. The two most commonly used antithrombotic regimens during PCI include heparin and bivalirudin. Previous studies that have compared these two options among patients undergoing PCI for ACS have provided conflicting results with respect to ischemic or bleeding outcomes. **Purpose:** The purpose of this study is to compare the major bleeding events (Based on the Bleeding Academic Research Consortium (BARC) (types 3 or 5), major adverse cardiac events (MACE), and cost differences between heparin and bivalirudin.

Methods: This study used an electronic medical record (EMR) system to identify adult patients 18 years and older with ACS undergoing PCI from 01/01/2014 to 12/31/2016 at ProMedica Toledo Hospital. Retrospective EMR data was also be used to review an equal number of randomized patients who received bivalirudin versus heparin during PCI. All data were recorded without patient identifiers and maintained confidentially. The following data were collected: demographic information, weight, past medical history, medications prior to PCI, type of ACS, type of stent, lengths and diameter of stent, location of stent, number of stents, femoral versus radial access, lab data including hemoglobin, hematocrit platelets, activated clotting time and serum creatinine, during PCI heparin or bivalirudin dose, and GPIIb/IIIa inhibitor use. These data were used to compare the major bleeding events (primary outcome), MACE, and cost differences between these two medications. Results and conclusion: to be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe bivalirudin and heparin mechanism of action and list dosing of either of these medications during PCI
Discuss comparative literature and identify patients who may be candidates for heparin versus bivalirudin

Self Assessment Questions:

MH is a 48 year old male presents to ProMedica Toledo Hospital emergency department with 2 hours of crushing chest pain. Pain started when plowing his driveway and continued even after resting. 12 lea

- A Heparin
- B: Bivalirudin
- C: Either bivalirudin or heparin
- D: Fondaparinux

What is the correct dose and route of administration for bivalirudin and heparin during PCI?

- A Heparin 5000 units subcutaneously; repeat dosing based on ACT,
- B Heparin 70 units/kg subcutaneously; repeat dosing based on ACT
- C Heparin 100 units/kg intravenously; repeat dosing based on ACT,
- D Heparin: Initial bolus dose is 70 to 100 units/kg intravenously; repe

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-508L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION OF RAPID DIAGNOSTIC TESTING AND TREATMENT ALGORITHM FOR RAPID IDENTIFICATION OF GRAM POSITIVE COCCI IN THE BLOODSTREAM

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The Infectious Diseases Society of America defines antimicrobial stewardship as optimizing antibiotic therapy for infection while decreasing inappropriate antibiotic use. Due to the increase in the prevalence of methicillin-resistant *Staphylococcus aureus* (MRSA) infections, rapid pathogen identification is crucial. Rapid diagnostic testing utilizes polymerase chain reaction technology to identify gram positive cocci as MRSA, methicillin-susceptible *Staphylococcus aureus* or non-*Staphylococcus aureus* within 1-2 hours. Utilization of rapid diagnostic testing has been shown to decrease time to appropriate antibiotics, length of stay and mortality. Bauer, et al. demonstrated that rapid diagnostic testing has minimal impact on patient outcomes without an antimicrobial steward having an active role in result interpretation. The purpose of this project is to evaluate the effectiveness of antimicrobial stewardship pharmacists-driven treatment algorithm on time to optimal antimicrobial therapy. The rapid diagnostic testing algorithm was designed to streamline antibiotic therapy based upon the resulting gram positive cocci. This is a pre- and post-intervention study conducted at a community hospital involving inpatients who had positive blood cultures for gram positive cocci. The primary objective is to compare time to targeted antimicrobial therapy, defined as the time from initiation of initial empiric antibiotics to time the antibiotics were tailored to the resulting pathogen, before and after implementation of rapid diagnostic testing combined with the pharmacists driven algorithm. Data collected includes; patient demographics, empiric antibiotic selection, culture results, rapid diagnostic test result, length of stay and antibiotic selection following pathogen identification.

Learning Objectives:

Discuss the advantages rapid diagnostic testing provides for antimicrobial stewardship.

Explain the technology utilized to perform rapid diagnostic testing.

Self Assessment Questions:

Preliminary blood cultures are growing gram positive cocci. Rapid diagnostic testing results as methicillin susceptible *Staphylococcus aureus*. Identify which antibiotic should be recommended:

- A Linezolid
- B: Cefazolin
- C: Vancomycin
- D: Amoxicillin

A rapid diagnostic test result showing non-MRSA and non-MSSA should not rule out the concern for infection. Identify what factor still poses a threat to this patient:

- A Enterococcus
- B Poor sensitivity of test
- C Coagulase negative *Staphylococcus*
- D No factor poses a threat to patient

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-596L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ANALYSIS OF THE DOOR TO LOOP DIURETIC TIMING IN PATIENTS WITH ACUTE DECOMPENSATED HEART FAILURE (ADHF) WITH AND WITHOUT PHARMACIST FACILITATION IN AN EMERGENCY DEPARTMENT (ED)

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Purpose: ADHF is the most common cause of hospital admissions in the United States, and a majority of patients receive intravenous (IV) loop diuretics for symptoms of volume overload or congestion. The most recent ACCF/AHA Guidelines state that patients with ADHF should be promptly treated in the ED with intravenous (IV) loop diuretics to reduce morbidity. Currently there are limited studies on the association between treatment time of loop diuretics and outcomes. The purpose of this study is to evaluate our current door to IV loop diuretic timing in the ED, assess a pharmacist's role in this process, and determine if there are clinical benefits with quicker administration. Methods: Consecutive hospital admissions from October 1 to November 30, 2016 that included ADHF as a part of the initial diagnosis were retrospectively reviewed. These admissions were evaluated to best include subjects in which ADHF was the primary working diagnosis in the ED. Baseline characteristics and timing data regarding the appropriateness of IV loop diuretic therapy were collected. ED providers were educated on the current guideline recommendations regarding ADHF management prior to a 2-week pilot of a pharmacist facilitating timely IV loop diuretic treatment. The pharmacist aimed to identify potential ADHF patients, clarify home diuretic dosing, follow up with lab results, and make a recommendation of IV loop diuretic dosing. The primary outcome is to determine if a significant difference exists in administration time before and after a pharmacist intervention. Secondly, the study aims to determine if there is a correlation between quicker IV loop diuretic treatment and average length of stay, or 30-day readmission rates. Results and Conclusions: Data collection and analysis are currently in progress. Final results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify barriers to timely administration of IV loop diuretics to ADHF patients

Discuss the potential role of a pharmacist in an ED with timely ADHF treatment

Self Assessment Questions:

Which of the following may contribute to a delay in administration of an IV loop diuretic to an ADHF patient?

- A Age
- B: Pending lab results
- C: Home loop diuretic dosing
- D: Most recent ejection fraction

A patient takes torsemide 20 mg PO once daily at home and you would like to administer an equivalent of two times the home dose as an IV bolus of bumetanide. Which dose would be appropriate?

- A 1 mg
- B 1.5 mg
- C 2 mg
- D 3 mg

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-415L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF PERIOPERATIVE AMIODARONE DOSING PROTOCOL ON RATES OF POST-SURGICAL ATRIAL FIBRILLATION

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Purpose: Despite the administration of perioperative beta-blockers and vitamin-C, both shown to decrease atrial fibrillation, postoperative atrial fibrillation persists as a common complication to cardiothoracic surgery which is correlated with an increased hospital length of stay and increased morbidity. The objective of this study is to evaluate the effect of a perioperative amiodarone dosing protocol on the rates of postoperative atrial fibrillation and adverse event profiles attributable to the administration of amiodarone. **Method:** The Lumedx reporting system will be used to identify patients that underwent CABG, aortic valve, or mitral valve surgeries, alone or in combination, prior to and following the implementation of a perioperative amiodarone dosing protocol. By reviewing the electronic health record, data will be collected including: patient demographics, serum creatinine, liver and thyroid function tests, incidence of atrial fibrillation, requirement of postoperative pacing, inotrope and pressor requirements at 24, 48, and 72 hours, hospital morbidity/mortality, mean number of grafted vessels, estimated left atrial size, mean aortic cross-clamp time, use of intra-aortic balloon pump, duration of hospital and critical care unit stay, and total hospital cost. All patient data will be de-identified to maintain confidentiality throughout the study. Effective participation in protocol administration will be defined as greater than 60% compliance of doses given during the hospital stay. Rates for incidence of postoperative atrial fibrillation, pacing requirement, and duration of post surgical hospital stay will be compared between each group. Statistical significance will be evaluated based upon an $\alpha = 0.05$ using independent samples. Continuous data will be compared with student's t test or Mann-Whitney test. Categorical data will be compared with Chi Square or Fisher's exact test. Data collection is in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Arrange common cardiothoracic surgical procedures by their propensity to induce post-operative atrial fibrillation

Identify evidence supported pharmacologic methods for reducing post-operative atrial fibrillation

Self Assessment Questions:

Please rank, from lowest to highest, the following procedures by their expected propensity to cause post-operative atrial fibrillation. I- LIMA to LAD + SVG aorta to RCA. II- Isolated AVR. III- MVR +

- A I,ii,iii,iv
- B: Ii,iii,i,iv
- C: Iv,i,ii,iii
- D: Iv,ii,i,iii

Which of the following strategies have been shown to reduce the rates of post-operative atrial fibrillation? I- Peri-operative Aspirin. II- Peri-operative beta-blocker. III- Peri-operative amiodarone.

- A I,iii,iv
- B Ii,iii,iv
- C Ii,iii
- D Ii, iv

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-518L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DEVELOPMENT AND IMPLEMENTATION OF ONCOLOGY TECHNICIAN TRAINING RESOURCES

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Purpose: The pharmacy department of Aurora Health Care (AHC) provides system-wide oncology services in both the 22 cancer clinics and 16 inpatient settings. By providing these oncology services, specially trained oncology technicians are utilized at nearly every site throughout AHC, as hazardous drugs, especially chemotherapy, are high risk to personnel and patients alike. Currently, initial and ongoing oncology-specific training resources for oncology technicians are not consistent between each setting. The lack of standardization of oncology-specific training resources results in a variation of training amongst oncology technicians. The primary objective is to design and implement standardized onboarding and ongoing oncology-specific training resources for oncology technicians to be utilized system-wide. **Methods:** A literature search on the standardization of oncology technician training was conducted, in addition to an evaluation of training resources from outside organizations. All current oncology-specific initial and ongoing training resource documents for oncology technicians in the clinic and inpatient setting were gathered and evaluated. Gaps in oncology technician training were identified and subsequently organized into a list of potential resources that will be updated or developed. Finalized training resources, both newly created and updated, will be approved through the organizations pharmacy training committee for implementation. Feedback from pharmacists, oncology technician trainers, and oncology technician trainees will be gathered. **Results/Conclusion:** Results and conclusion will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize a method to assess for gaps in technician training.

Identify a potential barrier when standardizing system-wide technician training resources.

Self Assessment Questions:

Which of the following is a method that can be utilized to assess for gaps in technician training?

- A Shadow the workflow in various settings
- B: Only evaluate training resources from outside organizations
- C: Disregard suggestions from technician trainers, trainees, and pharmacist
- D: Only evaluate onboarding training resources for technicians

What could be a potential barrier when standardizing system-wide technician training resources?

- A Not all training resources may be applicable to every setting
- B Possibility for duplication or overlap of information in other training
- C Standardizing training resources may have a negative impact on training
- D A and B

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-901L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DESIGN OF A SPECIALTY PHARMACY WITHIN A CONSOLIDATED PHARMACY SERVICE CENTER

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With the rapid expansion of the specialty pharmacy marketplace, the UW Health Specialty Pharmacy has invested significant personnel resources to provide patient support services such as remote clinical management, product fulfillment, and product delivery. Because specialty pharmacy services were developed within an existing ambulatory pharmacy footprint, growth and scalability of services results in suboptimal and fragmented workflows. In fall 2017, the pharmacy department will be shifting the Specialty Pharmacy program to a new consolidated pharmacy service center (CPSC). The purpose of this project is to coordinate the design of the UW Health Specialty Pharmacy and associated workflows within the CPSC. All specialty pharmacy-related services, personnel, and associated workflows transitioning to the CPSC were identified and documented, inclusive of equipment, supplies, and storage deemed necessary for specialty pharmacy operations. Workflow analysis, redesign, and piloting within the existing location was conducted prior to moving services to the CPSC, and key stakeholders were consulted to assist with design, casework, and layout of the physical spaces in order to promote operational efficiency and allow future expansion. Representatives from Security, Environmental Services, and Informatics were consulted throughout project development to ensure design of physical spaces maintained compliance with organizational policies while a separate task force was developed to ensure compliance with local, state, and federal licensing requirements as well as third-party payer contractual agreements. Expected results include finalized specialty pharmacy and call center design, with workflows vetted for transition to the CPSC. A transition plan will be formulated along with a timeline for migration of the specialty pharmacy and call center from the current location to the CPSC. Timelines for the transition of Specialty Pharmacy operations and services will be coordinated with other programs within the CPSC to ensure continuity of service for current patients.

Learning Objectives:

List the main considerations when designing a specialty pharmacy
Describe the process and importance of workflow redesign

Self Assessment Questions:

Which of the following should primarily be consulted when designing a new specialty pharmacy?

- A: Payor contracts
- B: URAC accreditation requirements
- C: State board of pharmacy regulations
- D: 503B regulations of the FD&C act

Which of the following is the first step in workflow redesign?

- A: Implementation
- B: Process mapping
- C: Data collection
- D: Frontline staff feedback

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-812L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPROVING ADHERENCE TO A STANDARDIZED SEPSIS TREATMENT PROTOCOL IN A COMMUNITY HOSPITAL

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Purpose: The organization implemented a multifaceted intervention within the institution including standardized treatment protocols and staff education to improve adherence to Centers of Medicare and Medicaid Services (CMS) National Core Measure for Sepsis directives. The objective of this study was to evaluate the impact of our intervention on compliance with sepsis treatment protocols. Methods: The intervention included education of relevant healthcare staff about sequence of antibiotic administration, fluid boluses, vasopressor selection, implementation of a checklist to be utilized when a diagnosis of sepsis is made, and numerical labeling of antibiotics prior to dispensing in the pharmacy. A pre-post study will be used to measure the impact of targeted interventions to improve adherence to the standardized sepsis treatment protocol. Data collection began 60 days pre-intervention and continues until 60 days post-intervention (start date 12/16/2016). The primary endpoint is measured adherence to the hospital sepsis protocol, type and amount of resuscitative fluids used, sequence of antibiotic administration, and vasopressor selection. Secondary endpoints include mortality, length of hospital stay, and fallout from CMS Core Measures for sepsis. Descriptive statistics will be used to describe patient demographics and endpoints in pre- and post-periods. Multivariate models will be used (if appropriate) to adjust for potential group differences. Preliminary results: The pre-intervention phase included 41 patients. Only 40% of the 23 patients eligible for fluid bolus received treatment with fluid bolus. 13 patients in the pre-intervention phase received vasopressors, with 77% of patients receiving norepinephrine as their first vasopressor. The remaining patients received dopamine first. 17% of patients (7/41) did not receive antibiotics in order of most broad spectrum to least broad spectrum. Conclusion: The preliminary data suggests room for improvement, particularly in regards to adherence to fluid bolus administration. More data is needed before evaluating whether the institutions intervention increases adherence to sepsis treatment protocols.

Learning Objectives:

Define fluid bolus requirements for indication of sepsis and septic shock
Identify an appropriate vasopressor for a patient with septic shock

Self Assessment Questions:

According to the Surviving Sepsis Campaign, what is the target mean arterial pressure (MAP) in patients with septic shock requiring vasopressors?

- A: MAP > 60 mm Hg
- B: MAP > 65 mm Hg
- C: MAP < 60 mm Hg
- D: MAP > 75 mm Hg

According to the Surviving Sepsis Campaign, which of the following vasopressors is recommended as the first-choice vasopressor in septic shock?

- A: Vasopressin
- B: Epinephrine
- C: Norepinephrine
- D: Dopamine

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-549L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF SINGLE-DOSE SODIUM POLYSTYRENE SULFONATE FOR TREATMENT OF HYPERKALEMIA IN HOSPITALIZED PATIENTS WITH CHRONIC KIDNEY DISEASE OR END STAGE RENAL DISEASE

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Purpose: Hyperkalemia, or elevated serum potassium, is a serious medical condition that commonly occurs in hospitalized patients. Hyperkalemia can lead to cardiac arrhythmias, muscular weakness and death. The use of sodium polystyrene sulfonate (SPS) for the treatment of hyperkalemia has been endorsed in multiple guidelines. Studies evaluating SPS use in the general population have shown varying efficacy. Furthermore, studies are limited in those with renal insufficiency. Recent evidence suggests that this population may be at higher risk for serious gastrointestinal adverse effects with SPS use. The purpose of this study is to evaluate the efficacy and safety of single-dose SPS therapy for the treatment of acute hyperkalemia in patients with renal insufficiency. **Methods:** A single-center retrospective cohort study was conducted from January 2010 through September 2016. Patients 18 and older with renal insufficiency (chronic kidney disease grade 4 and 5 or hemodialysis-dependent end stage renal disease), a documented serum potassium greater than 5 mEq/L, and who received SPS therapy during hospitalization were included. Exclusion criteria consisted of acute kidney injury or pregnancy at the time of treatment, previous inclusion into the study, receipt of concomitant therapies for the treatment of hyperkalemia and a documented history of obstructive bowel disease. A sample size of at least 119 patients was needed based on an effect size of 0.3, a significance level of 5% and a power of 90%. The primary outcome is mean difference in serum potassium levels at 12 hours after single-dose SPS therapy. Secondary outcomes include: mean difference in serum potassium at 18 and 24 hours post-SPS; incidence of normokalemia, hypokalemia, and HD within 24 hours; and gastrointestinal adverse effects associated with SPS therapy within 30 days. **Results:** Results are pending. **Conclusion:** Conclusions are pending statistical analysis.

Learning Objectives:

Identify options for medical management of hyperkalemia and describe their mechanisms of action

Recognize who may be at risk for serious gastrointestinal side effects after SPS use

Self Assessment Questions:

Which of the following medications used to treat hyperkalemia is correctly paired with its mechanism of action?

- A Calcium salts: intracellular shift of potassium
- B SPS: exchange bound sodium for potassium in the bowel
- C Insulin/dextrose: antagonizes cardiac membrane excitability
- D Sodium bicarbonate: extracellular shift of potassium

Which of the following is a risk factor for the development of gastrointestinal adverse effects after SPS use?

- A Avoidance of concomitant sorbitol use
- B History of hyperkalemia development
- C Use of concomitant anti-diarrheal therapies
- D Absence of a post-operative bowel movement

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-440L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EFFECTS OF ACID SUPPRESSIVE THERAPY ON CLINICAL OUTCOMES IN PATIENTS TREATED WITH TIGECYCLINE FOR BLOODSTREAM INFECTION

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Purpose: Tigecycline is a glycylcycline antibiotic with activity against Gram-positive and Gram-negative, aerobic and anaerobic bacteria. Due to its broad-spectrum activity and ability to evade tetracycline efflux pumps, tigecycline is regarded as a last resort to treat multidrug-resistant pathogens and is often used off-label to treat bloodstream infection (BSI). However, due to its large volume of distribution and bacteriostatic activity, the low serum concentrations achieved with standard dosing may not overcome typical organism minimum inhibitory concentrations (MICs). Given the frequency of proton pump inhibitor (PPI) use observed in hospitals, an in vitro study investigated the effect of PPIs on tigecycline activity. When cultures were supplemented with human simulated concentrations of pantoprazole, a two-fold increase in tigecycline MIC was reported for several organisms. It is unknown whether this in vitro effect on tigecycline activity translates to worse clinical outcomes. Our study aims to investigate whether concomitant PPIs plus tigecycline affects clinical outcomes in BSI and to determine the potential need to evaluate alternative treatments. **Objectives:** Primary outcome will compare 28-day all-cause mortality. Secondary outcomes include favorable clinical response, microbiologic cure, and incidence of breakthrough infection. **Methods:** This retrospective cohort study will evaluate clinical outcomes in patients who received tigecycline for ≥ 48 hours and had a minimum ≥ 1 positive culture documenting BSI. Those with bacterial isolates resistant to tigecycline will be excluded. The two study groups will be patients receiving tigecycline with and without PPI for the initial 48 hours of tigecycline therapy. Patients will be matched 1:1 based on Gram-negative vs. Gram-positive organism and receipt of combination definitive antimicrobial therapy. Variables collected will encompass severity of illness at baseline, acid suppressive therapy, and infection-related data. Multivariable logistic regression will assess for independent predictors of 28-day mortality. **Results and Conclusions:** To be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the spectrum of activity of tigecycline and its indications

Explain the properties of tigecycline that may make it less optimal for treatment of bloodstream infections

Self Assessment Questions:

Which of the following is false regarding tigecyclines spectrum of activity?

- A It has broad-spectrum activity against Gram-positive, Gram-negative
- B Tigecycline retains some activity against carbapenem-resistant Enterobacteriaceae
- C Tigecycline has FDA-approved indications of complicated intra-abdominal infections
- D The ability of tigecycline to evade tetracycline efflux pumps is a mechanism of resistance

What properties of tigecycline make it less optimal for treatment of bloodstream infection?

- A Tigecycline is effective and indicated for treatment of bloodstream infections
- B It has a large volume of distribution and achieves low serum concentrations
- C Tigecycline displays bacteriostatic activity
- D B and C

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-449L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ANALYSIS OF SEVERAL PSYCHOLOGICAL FACTORS, INCLUDING STRESS, AMONG CURRENT PGY2 PHARMACY RESIDENTS TRACKED THROUGHOUT THE YEAR

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Purpose: The number of residents and residency programs continues to increase every year with now over 2,000 unique residency programs accredited by the American Society of Hospital Pharmacists. Post-graduate training can be a stressful and trying time for pharmacists within this new role. There are several studies available assessing stress and burn-out in medical residents, however few studies exist for pharmacy residents. The purpose is to identify potential factors contributing to stress tracked throughout the resident year and to discover how these pharmacists pursuing residency training are handling these new challenges. **Methods:** In order to evaluate the purpose, this IRB approved, prospective study utilizes surveys via Survey Monkey Pro that will be sent to all ASHP accredited second year post-graduate pharmacy residents to determine levels of stress, anxiety, and depression throughout the residency year. Pharmacy residents were asked baseline questions along with a series of psychological questions asked within the Depression-Anxiety-Stress Survey (DASS-21). Baseline questions included demographic information, residency type, program expectations, weekend requirements, number of duty hours, sleep schedules, triggers of stress, and coping strategies. Initial survey results have been compiled for two quarters of data that were collected from surveys sent out in August and December. Further surveys will be sent in March and again at the end of May, which will include a final sub-set of follow-up questions.

Results: Through January 15th, 2017, 131 PGY2 residents have completed the first quarter survey and 218 completed the second quarter survey. When asked subjectively to rate their levels of stress, 5% of residents stated they were "very stressed", 35% were "frequently stressed", 50% were "occasionally stressed", and 10% were "rarely stressed". **Conclusion:** Comprehensive baseline results, the full DASS-21 analysis for each quarter, and conclusions will be presented at the 2017 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review methods used to identify psychological factors in surveys and other studies

Describe which factors residents have identified as causing the most stress throughout the residency year

Self Assessment Questions:

Which factors are considered within the DASS-21 questionnaire?

- A Depression
- B Anxiety
- C Stress
- D All the above

Which factor have residents identified as the highest cause of stress during the year?

- A Teaching requirements
- B Projects/Residency requirements
- C Patient care requirements
- D Post-graduation career planning

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-747L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

UTILIZATION OF A PHARMACIST IN THE EMERGENCY DEPARTMENT (ED) AT A VETERANS AFFAIRS MEDICAL CENTER

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Purpose: To analyze the potential benefits of incorporating a Pharmacist into the Emergency Department (ED) in regards to patient care, cost savings, and patient safety. The information collected will provide data to support the creation of a full time ED pharmacist position. **Methods:** The original project was completed in 2014 which incorporated PGY-1 and PGY-2 residents covering the ED for 6 months and documented interventions provided. A reassessment of the of the previously mentioned project was conducted in order to verify a continued need for an ED pharmacist due to large provider changeover and a renewed desire establish the position. A PGY-2 internal medicine pharmacy resident was stationed in the ED provider team room for 7 weeks from October to December, 2016. Primary responsibilities included providing therapeutic recommendations, first dose kinetics, dose adjustments, responding to drug information inquiries. Secondary tasks include medication reconciliation, discharge education, order verification, optimizing formulary management, and code blue coverage. Data was collected to document any utilization of the pharmacist while in the ED including all the above mentioned tasks. A survey was distributed to all ED staff at the conclusion of the study period to gather insight into the provider experience of an ED pharmacist. This information was used to create a new business plan to support the initiation of a full time ED Clinical Pharmacy Specialist and submitted for formal review. **Preliminary Results:** The data collected in this trial supports a positive effect of an ED pharmacist in cost avoidance with an approximate \$200,000 per year savings, and provider satisfaction per survey results. Preliminary results suggest the benefits for a ED clinical pharmacy specialists are consistent with previous 2014 data regardless of large provider changeover. **Conclusions:** Conclusions to be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Indicate how ED pharmacists impact the institution

Recall various duties performed by ED pharmacists

Self Assessment Questions:

What is the financial impact provided by incorporating an ED pharmacist?

- A Income generating
- B Cost Avoidance
- C Cost Neutral
- D None of the above

Which of the following is NOT a usual duty performed by ED pharmacist

- A Code blue coverage
- B Medication Reconciliation
- C Phone follow up on complex patients
- D First Dose Kinetics

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-793L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DIRECT ORAL ANTICOAGULANT (DOAC) ADHERENCE AND THE RISK OF STROKE AMONG PATIENTS WITH ATRIAL FIBRILLATION

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Purpose Unlike warfarin, direct oral anticoagulants (DOACs) have fewer drug-drug and drug-food interactions and do not require frequent laboratory monitoring. Given the short half-lives of DOACs, a high degree of medication adherence is crucial for reducing the risk of thrombotic events in patients with atrial fibrillation. The lack of need for frequent monitoring and close follow-ups may limit opportunities for early detection of medication non-adherence. The objectives of this retrospective analysis are to characterize adherence patterns of DOACs among patients with atrial fibrillation and analyze their association with long-term patient outcomes. **Methods** This will be a retrospective analysis of patients with atrial fibrillation who were initiated on dabigatran, rivaroxaban, or apixaban within the last 3 years. Given the retrospective nature of this quality improvement analysis, it will be exempt from institutional review board approval. Patient records will be obtained from the VA Corporate Data Warehouse (CDW). Data collected and analyzed will include patient demographics, CHADS2 score, HAS-BLED score, and Charlson-Deyo comorbidity index. Measure of adherence will be calculated based on fill dates and day supply. Primary end points of this study include all-cause mortality with a secondary end point of stroke and bleeding events. Comparisons between adherent and nonadherent groups will be assessed using chi-square test for categorical variables and independent samples t-test for continuous variables with normal distribution. Kaplan-Meier analysis will be used to determine the association between DOAC nonadherence and endpoints. Findings of this study will be used to identify patients who have adherence rates < 80% and alert providers for closer follow-up and intensive counseling about the risks associated with DOAC non-adherence. **Results** Data collection in progress. **Conclusions** Reached To be presented at GLPRC

Learning Objectives:

Report findings of a retrospective analysis of DOAC adherence in patients with atrial fibrillation at the Milo C. Huempfer VA
Discuss the impact pharmacist interventions may have on risk reduction of negative clinical outcomes (e.g., thrombotic events)

Self Assessment Questions:

Which of the following is an advantage of using apixaban over warfarin?

- A: Once-daily dosing
- B: Less frequent monitoring
- C: Current availability of reversal agents
- D: A and C

INR can be used to measure adherence to which of the following medications?

- A: Apixaban
- B: Dabigatran
- C: Warfarin
- D: Rivaroxaban

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-711L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

OUTCOMES ASSOCIATED WITH ANTIBIOTIC TIMING POST-BRONCHOSCOPY IN VENTILATOR ASSOCIATED PNEUMONIA

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Purpose: Ventilator-associated pneumonia (VAP) is the second most common nosocomial infection in the intensive care unit (ICU). VAP occurs in 9 to 27 percent of mechanically ventilated patients and is associated with a 2.5-fold increase in all-cause mortality. Current VAP guidelines recommend early empiric antibiotic treatment based on local distribution of pathogens. This approach is supported by evidence suggesting early, appropriate antibiotic administration decreases mortality in sepsis. While some clinicians initiate antimicrobial treatment empirically at the time of bronchoscopy, others delay the initiation of antimicrobials by more than 24 hours based on the results of microbiologic studies. The investigators hypothesize that patients receiving appropriate antibiotic therapy within 24 hours of bronchoscopy will be associated with a lower rate of in-hospital mortality compared with patients receiving therapy greater than 24 hours after bronchoscopy. **Methods:** This retrospective, single center, cohort study included adult patients admitted to the surgical, burns, medical, cardiac, or neuroscience ICU with a diagnosis of VAP and positive microbiologic cultures. Positive cultures were defined as $\geq 10,000$ cfu/mL growth of one or more pathogenic organism(s) on a bronchoalveolar lavage (BAL). The primary objective of this study was to compare the rate of in-hospital mortality between critically ill patients initiated on appropriate empiric antibiotic therapy within 24 hours of bronchoscopy versus those initiated greater than 24 hours after bronchoscopy. Secondary outcomes included comparison of clinical improvement marked by changes in the Clinical Pulmonary Infection Score, antibiotic therapy days, mechanical ventilation days, and ICU and hospital length of stay. Appropriateness of empiric antibiotic therapy and presence of multidrug resistant bacterial strains were also evaluated. Appropriate antibiotic therapy was defined as demonstrated in vitro activity against the identified species associated with the infection. Kaplan-Meier curves and log-rank tests were utilized to assess mortality outcomes. **Results:** Data collection and analysis are ongoing.

Learning Objectives:

Describe diagnostic criteria and appropriate treatment for ventilator-associated pneumonia

Discuss the impact of time to initiation of empiric antibiotics on clinical outcomes

Self Assessment Questions:

Which of the following does the 2016 American Thoracic Society and Infectious Disease Society of America guideline recommend to use as a diagnostic tool for VAP?

- A: Procalcitonin level
- B: Clinical Pulmonary Infection Score (CPIS)
- C: Chest Radiograph
- D: Bronchoalveolar Lavage

Per the 2016 American Thoracic Society and Infectious Disease Society of America guideline, which is an acceptable empiric antibiotic regimen for a patient with acute respiratory distress syndrome pre

- A: Zosyn + Vancomycin
- B: Ceftriaxone + Tobramycin + Linezolid
- C: Cefepime + Tobramycin + Vancomycin
- D: Levofloxacin + Meropenem

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-370L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF A PHARMACIST DE-ESCALATION PROTOCOL IN A COMMUNITY HOSPITAL UTILIZING A RAPID DIAGNOSTIC BLOODSTREAM TESTING DEVICE

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Rapid assay blood culture technology allows for expeditious recognition of gram-positive and gram-negative bacteria and some resistance markers in patients with bacteremia. At Community Memorial Hospital (CMH) positive cultures are reported to pharmacists who then communicate stewardship recommendations to providers. The purpose of this project is twofold: first to analyze outcomes associated with implementation of rapid assay blood culture technology and pharmacist intervention, and second to implement and assess impact of a pharmacist-driven methicillin resistant *Staphylococcus aureus* (MRSA) de-escalation protocol. Our single site prospective study with retrospective data analysis evaluated outcomes before (n=76) and after (n=58) implementation of the rapid assay blood culture technology. Patients were included if they were age 18 or older with a positive blood culture on admission. Our primary outcome, time to optimal therapy, was improved by approximately 16 hours (p=0.051). Implementation of rapid assay blood culture technology along with pharmacist intervention decreased hospital stay by 1.1 days (p= 0.25) and ICU length of stay by 1.6 days (p= 0.20). In order to maximize utility of rapid diagnostic blood testing, a pharmacist-driven MRSA de-escalation protocol was developed. Patients eligible for vancomycin or linezolid de-escalation include those with methicillin sensitive *Staphylococcus aureus* (MSSA) bacteremia and gram-negative bacteremia from a known urinary source. The primary outcome evaluated will again be time to optimal antimicrobial therapy. Additional secondary outcomes to be evaluated include time to effective therapy, length of hospital and ICU stay, 30 day bacteremia related readmission, in hospital mortality, and antibiotic associated costs. Expected results include a shorter time to optimal antimicrobial therapy and a decrease in length of stay. In conclusion, community hospitals can utilize rapid diagnostic bloodstream tests with clinical pharmacists to yield compelling clinical improvements and assist with appropriate de-escalation of antimicrobial therapy.

Learning Objectives:

Identify antimicrobial stewardship opportunities related to rapid diagnostic blood stream testing

Discuss the unique role the pharmacist can serve in a community hospital as a catalyst for de-escalation

Self Assessment Questions:

What is the most common stewardship intervention associated with rapid diagnostic technology?

- A: De-escalation of therapy targeting gram negative organisms
- B: De-escalation of unnecessary vancomycin therapy
- C: Escalation of therapy to cover MRSA
- D: De-escalation of duplicate anaerobic coverage

Which of the following interdisciplinary teams can assist in improving antimicrobial stewardship initiatives through appropriate and timely de-escalation?

- A: Physicians
- B: Pharmacists
- C: Laboratory Personnel
- D: All of the above

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-520L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ANTIMICROBIAL PROPHYLAXIS IN ADULT AND PEDIATRIC HEMATOPOIETIC STEM CELL TRANSPLANT PATIENTS

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Purpose: The purpose of this project is to use the best currently available evidence to create a single, readily accessible institutional clinical practice guideline for use in the adult and pediatric hematopoietic stem cell transplant (HSCT) population at UW Health in order to standardize the use of antimicrobial prophylaxis agents, ensure compliance with institutional standards for accreditation visits, and improve patient care. **Methods:** A multidisciplinary workgroup consisting of pharmacists, physicians, and nurse practitioners assembled to develop and implement the clinical practice guideline. A review of current institutional standards included standard operating procedures and order sets for the prevention of bacterial, viral, fungal, and *Pneumocystis jirovecii* infections in patients who have received an autologous or allogeneic HSCT. National guidelines and recent literature supplemented these recommendations and coalesced into a single institutional clinical practice guideline. Order sets were updated or created, when necessary, to reflect guideline-supported practice changes. A dashboard profiling guideline adherence and corresponding rates of surrogate adherence measures, such as CMV infection, will be created using data from the electronic medical record, allowing pharmacists to identify patients whose prophylactic therapy for CMV differs from the implemented guidelines. **Expected results:** Expected results include an institutional-approved, evidence-based, consensus clinical practice guideline, electronic health record tools to improve guideline adherence, a guideline adherence monitoring tool, and improved patient outcomes as measured by positive serum CMV titers, and decreased rates of CMV and invasive fungal infection. **Conclusions:** Pharmacists, physicians, and advanced practice providers from the HSCT and infectious disease services are able to find consensus for an evidence based guideline to prevent infectious diseases in adult and pediatric HSCT patients. In forming this consensus, tools to improve guideline adherence can be created. This adherence and corresponding patient outcomes can be measured via surrogate measures such as the incidence of CMV and invasive fungal infection.

Learning Objectives:

Explain the importance of antimicrobial prophylaxis in hematopoietic stem cell transplant patients

Select optimal agents for the prevention of bacterial, fungal, viral, and PJP infections in hematopoietic stem cell transplant recipients

Self Assessment Questions:

Which of the following statements about infectious diseases in hematopoietic stem cell transplant patients is correct?

- A: Antiviral prophylaxis has not been shown to prevent reactivation of
- B: Appropriate antimicrobial prophylaxis can prevent all episodes of
- C: Hematopoietic stem cell transplant patients are at low risk for fung
- D: Infectious diseases are a leading cause of death in this population

Which of the following would be the preferred agent for PJP prophylaxis in a patient with no allergies?

- A: Dapsone
- B: IV pentamidine
- C: Nebulized Pentamidine
- D: Sulfamethoxazole/trimethoprim

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-464L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EFFECT OF EARLY PULMONARY MECHANICS ON SEDATIVE DOSI REQUIREMENTS

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Purpose: Mechanical ventilation is a common cause of agitation in the intensive care unit (ICU). Inappropriate sedative management leads to poor outcomes in this patient population. Current data exists describing the effect of sedative administration on mechanical ventilation but there is a lack of data concerning the inverse of that interaction. The aim of this study is to determine the effect early pulmonary mechanics have on sedative dose requirements, specifically looking at three different weight based tidal volume designations, within the first 48 hours after intubation. **Methods:** This study is a retrospective cohort study in mechanically ventilated patients within the medical ICU at a large academic medical center. Data will be collected on approximately 130 patients based on a sample of convenience from August 2016 through December 2015 in reverse chronological order. The patient population will include mechanically ventilated patients aged 18-80 within the medical ICU. Patients will be excluded if their duration of mechanical ventilation is less than 48 hours, their admission is for cardiac arrest, toxic ingestion or acute neurologic injury, or receive therapeutic paralysis. The primary endpoint will be sedative dose requirements within the first 48 hours in three cohorts based on tidal volume administered (less than 7 ml/kg, 7-9 ml/kg or greater than 9 ml/kg based on ideal body weight). Secondary endpoints will include amount of opioids administered, duration of mechanical ventilation, ICU and hospital length of stay and other pulmonary mechanic metrics. Data will be analyzed using IBM SPSS Statistics 23. Continuous data will be analyzed using Students T-test and nominal data will be analyzed using a chi-square test. **Results/Conclusions:** Results and conclusions to be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the rationale for sparing benzodiazepine regimens for sedation in the ICU

Define the risks of under sedation in mechanically ventilated patients

Self Assessment Questions:

Which of the following is a risk of using benzodiazepines for sedation in the ICU?

- A: Deeper levels of sedation are achievable
- B: Independent risk factor for delirium
- C: Reduced mechanical ventilation time
- D: Low risk of accumulation

Which of the following is a hazard of under sedating a mechanically ventilated patient?

- A: Self extubation
- B: Decreased RASS score
- C: Reduced hospital length of stay
- D: Increased mortality

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-648L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION OF A MULTIFACETED PHARMACY-LED MEDICAL EDUCATION TO REDUCE ASYMPTOMATIC BACTERIURI/TREATMENT RATES WITHIN AN EMERGENCY DEPARTMENT

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Purpose: Asymptomatic bacteriuria (ABU) is a common occurrence that represents colonization as opposed to infection yet is often inappropriately treated with antibiotics. This inappropriate treatment frequently begins within the Emergency Department (ED) as a reaction to an abnormal urinalysis (UA) which may subsequently be continued as an inpatient regimen. The unnecessary use of antibiotics leads to an increased risk for multidrug resistant bacteria, *Clostridium difficile* infection, and avoidable healthcare costs. Thus the purpose of this quality improvement project was to evaluate the effects that a pharmacy driven multifaceted educational intervention had on the rates of inappropriately treated ABU within a single-center ED. **Methods:** This education was communicated to nurses, midlevel practitioners, and physicians within the ED through in-person discussions, emails, and general distribution over a period of one month. The education consisted of two components: an algorithm for appropriately evaluating an abnormal UA and an informative handout on ABU. In order to evaluate the effectiveness of the education we are determining the pre- and post-intervention rates of inappropriate treatments through two retrospective chart reviews, each containing data over a one-month time period. Patients presenting to the ED during the month of review who had an abnormal UA and were ordered pre-specified antibiotics for a urinary tract infection (UTI) indication in the ED will be included. Patients will then be filtered according to the presence or absence of documented UTI signs or symptoms. If UTI signs or symptoms are not documented, the patient will be recorded as being inappropriately treated with an antibiotic regimen for ABU. The primary outcome will be the difference in the frequency of inappropriately treated ABU after implementation of the educational intervention as compared to before implementation.

Results/Conclusions: Data collection and analysis is currently in progress and will be presented at the Great Lakes Resident Conference

Learning Objectives:

Describe the rates of inappropriately treated asymptomatic bacteriuria and its associated adverse effects on the health system.

Discuss the appropriate management of asymptomatic bacteriuria.

Self Assessment Questions:

Previous literature has associated the inappropriate use of antibiotics with which of the following outcomes:

- A: Multidrug resistant bacteria.
- B: *Clostridium difficile* infection.
- C: Avoidable healthcare costs.
- D: All of the above.

Which of the following patients would be most appropriate to treat with antibiotics for asymptomatic bacteriuria?

- A: 60 year-old male with diabetes and coronary artery disease presenting with
- B: 30 year-old female with no past medical history presenting as a Le
- C: 25 year-old pregnant female with hypertension presenting with hea
- D: 40 year-old male presenting with asthma exacerbation.

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-480L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

INCIDENCE OF POTASSIUM ABNORMALITIES DURING COOLING, MAINTENANCE, AND REWARMING PHASES OF THERAPEUTIC HYPOTHERMIA IN PATIENTS AFTER RETURN OF SPONTANEOUS CIRCULATION

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Purpose: The Advanced Life Support Task Force recommends that comatose patients with return of spontaneous circulation (ROSC) after cardiac arrest undergo therapeutic hypothermia (TH). Therapeutic hypothermia is a constant temperature between 32-36 C for at least 24 hours. Cleveland Clinic Akron General has a standardized electrolyte replacement protocol, but the incidence and type of electrolyte abnormalities have not been established at this institution or in the literature. The primary objective of this study is to report the incidence of potassium abnormalities during the cooling, maintenance, and rewarming phases of TH in patients with ROSC after cardiac arrest. Secondary objectives will report the incidence of magnesium, glucose, phosphorus, and ionized calcium abnormalities during each phase of TH; report the treatment of hyperkalemia; quantify the amount of electrolyte replacement required during TH; and report predictors of potassium abnormalities in patients undergoing TH. **Methods:** This study was approved by the Institutional Research Review Board. The electronic medical record identified patients who were charged for the Arctic Sun Hypothermia Pads and received at least 12 hours of TH after cardiac arrest. The following data was collected: age; gender; race; comorbidities (diabetes mellitus, congestive heart failure, renal insufficiency, end stage renal disease on hemodialysis); presenting temperature; presenting and subsequent electrolyte values (glucose, magnesium, ionized calcium, potassium, phosphorus); lowest cooled temperature; presence of insulin infusion; time to rewarming; first reported rhythm of arrest; and cerebral performance category score on discharge. The potassium levels for all patients were compared based on which phase (cooling, maintenance, rewarming) of TH the level was obtained in. Data collected was used to determine predictors of potassium abnormalities during TH. **Results:** To be presented at the Great Lakes Pharmacy Resident Conference. **Conclusion:** To be presented at the Great Lakes Pharmacy Resident Conference

Learning Objectives:

Describe the Advanced Life Support Task Force of the International Liaison Committee on Resuscitation guidelines for targeted temperature management or therapeutic hypothermia

List electrolytes that have been shown to have abnormal values during therapeutic hypothermia

Self Assessment Questions:

In which of the following patients would therapeutic hypothermia be appropriate?

- A A patient who underwent an out of hospital v. fib arrest with ROSC
- B: A patient with an in hospital PEA arrest who has a code status of I
- C: A patient with an out of hospital v. tach arrest with ROSC who is A
- D: A patient with an in hospital asystole arrest with ROSC with stage

Which of the following electrolytes have been shown to have abnormal values during therapeutic hypothermia

- A Potassium
- B Glucose
- C Sodium
- D A and B

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-353L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EFFECT OF TARGETED EDUCATIONAL SESSIONS ON HEMOGLOBIN A1C AND BLOOD PRESSURE IN COMMUNITY SENIORS.

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Purpose: The geriatric population within the United States is rapidly increasing. Between 2005 and 2050, the elderly population in America is predicted to double. As this trend continues to rise, healthcare providers will need to employ innovative strategies to reach community seniors. While multiple educational and health screening events have been documented, the effects of brief educational sessions provided by pharmacists have not been well-studied. The objective of this study was to determine the impact of targeted educational interventions on the ability of elderly patients to improve blood pressure and hemoglobin A1c (HbA1c) over a period of 4 months. **Methods:** Pharmacy students, under the direction of Butler University College of Pharmacy and Health Sciences (COPHS) faculty, provided two separate health screenings for participants in the Senior Companion Program with Catholic Charities of Indianapolis, IN. HbA1c and blood pressure (recorded as mean arterial pressure, MAP) were assessed during each screening event. During the months between each screening, pharmacy residents provided 10-minute education sessions at monthly meetings focusing on exercise, salt intake, and nutrition basics for weight loss. After the completion of the last screening, results of the pre-intervention and post-intervention HbA1c and blood pressure were compared using Wilcoxon signed rank test with an α of 0.05. **Results:** When comparing the pre- and post-intervention screenings, no significant differences were found in mean HbA1c or MAP. The mean HbA1c and MAP were 6.23% and 98 mmHg at the initial screening, 6.25% and 97 mmHg at the follow up screening. There were no significant differences in weight, systolic blood pressure, or diastolic blood pressure between the two events. **Conclusion:** Targeted educational interventions did not significantly alter A1c or MAP in community seniors over time. More extensive education may be needed to improve health outcomes in this well-managed population.

Learning Objectives:

Discuss nonpharmacologic methods for management of diabetes and hypertension

Identify patients at risk of developing diabetes

Self Assessment Questions:

What is the target maximum dietary sodium intake recommended by the American Heart Association?

- A <1200 mg/day
- B: <1500 mg/day
- C: <2000 mg/day
- D: <2300 mg/day

Which of the following is a risk factor for development of diabetes?

- A Elevated LDL cholesterol
- B Cousin with type 2 diabetes
- C Hypertension
- D A1c of 5.5%

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-873L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF MEDICATIONS UTILIZED IN POORLY CONTROLLED HYPERTENSIVE AMBULATORY CARE PATIENTS

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Statement of the purpose Cardiovascular disease continues to be a leading cause of death in the United States, and it is well known that blood pressure lowering to target can lead to significant decrease in this mortality caused by heart attack, stroke and other cardiovascular disease. Current hypertension guidelines recommend the most effective agents to lower blood pressure are angiotensin converting enzyme-inhibitors (ACEI), angiotensin receptor blockers (ARB), calcium channel blockers (CCB), and thiazide-diuretics alone or in combination. The purpose of this study was to improve hypertension control at the St. Vincent Joshua Max Simon Primary Care Center (PCC) by evaluating evidence based physician decision making surrounding utilization of first line anti-hypertensive medications. Statement of methods used This project was a retrospective quality improvement project to identify patients with BP >140/90mmHg on non-optimized first line therapies for hypertension. The target population was patients at the PCC. One hundred encounters were evaluated for data collection. Inclusion criteria were patients active in the internal medicine or family medicine clinic, aged 18-80 years of age, had an elevated systolic or diastolic blood pressure on 2 visits over the past 6 months, and at least 1 of those visits where evaluation of hypertension was documented. The primary outcomes include percentage of patient uncontrolled on non-optimized first line therapies without documented intolerance and percentage on second line therapies without a compelling indication. Secondary outcomes include identifying patients aged 60-80 years old who are controlled to a higher goal of <150/ <90 mmHg, percentages of each medication prescribed, and patients who are black and not on first line therapies of calcium channel blocker or a thiazide diuretic. Summary of (preliminary) results to support conclusion Data evaluation is in progress. Conclusions reached Conclusions will be presented at Great Lakes Regional Residency Conference.

Learning Objectives:

Recognize the two most common non-first line hypertensive medications that are utilized by resident physicians at the St. Vincent Primary Care Center.

Identify the three most common reasons that resident physicians at the St. Vincent Primary Care Center do not prescribe first line options when a patient's blood pressure is elevated.

Self Assessment Questions:

The Resident Physicians at the St. Vincent Primary Care Center prescribe which of the following non-first line classes of medications most commonly?

- A: Aldosterone antagonists
- B: Alpha2-adrenergic agonist
- C: Beta Blockers
- D: Vasodilators

Which of the following is the most common reason that resident physicians at the St. Vincent Primary Care Center do not prescribe first line options when a patient's blood pressure is elevated?

- A: Patient declined change
- B: Patient recently missed their medications
- C: Patient reported home blood pressure in range
- D: Wait until the following visit to re-evaluate

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-428L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

OPTIMIZATION OF CURRENT ONCOLOGY TREATMENT CONDITIONS

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Purpose: Aurora Health Care (AHC) is a private, not-for-profit integrated health care system, comprised of 16 hospitals and 22 outpatient oncology clinics throughout southeastern Wisconsin. The Aurora Cancer Care team utilizes an electronic health record (EHR) to provide consistent quality care. All of our oncology regimens are built into the EHR as treatment plans. Treatment conditions built within our oncology treatment plans provide monitoring parameters, many based on measurable laboratory criteria. These treatment parameters help ensure the safety of our patients. When a treatment condition is not met, it requires verification with the providers before a pharmacist may release the therapy for preparation and administration. Currently, many of our treatment plans are built with one standard treatment condition: ANC < 1,500/microL or platelets < 100,000/microL. However, these treatment conditions may not be appropriate for each oncology plan. Not only does this compromise the potential safety of our patients, but the interrupted workflow may be unnecessary in many circumstances. AHC determined that there was a need to evaluate the current treatment conditions in order to ensure appropriate patient safety and monitoring, but also to prevent avoidable treatment delays and workflow inefficiencies. The objective is to align existing treatment conditions with current best evidence. Methods: The first step was garnering endorsement through various interdisciplinary groups. Consensus was made to approve an already identified interdisciplinary group with the task of accepting any proposed changes. Literature reviews were performed on all individual drug and multiple drug protocols. The treatment conditions were modified based on objective laboratory parameters. Based on the available evidence, treatment conditions were proposed on a monthly basis for approval. Once approved, the treatment conditions were built and implemented into the current workflow. Preliminary Results/Conclusions: Data collection is currently pending and results will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the purpose of treatment conditions

Identify two reasons why treatment conditions should be specific to a particular treatment plan

Self Assessment Questions:

Describe the purpose of treatment conditions

- A: For the pharmacist to make the final decision whether a patient should
- B: To provide monitoring parameters to help ensure the safety of our
- C: Provide absolute parameter(s) for proceeding with treatment
- D: B and C

What are the benefits of treatment plan specific treatment conditions

- A: To ensure appropriate patient safety and monitoring
- B: To prevent avoidable treatment delays and workflow inefficiencies
- C: To eliminate the need for provider follow-up for dose modification
- D: A and B

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-964L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

INCIDENCE AND TIME TO CYTOMEGALOVIRUS DISEASE IN CARDIAC TRANSPLANT RECIPIENTS RECEIVING INDUCTION IMMUNOSUPPRESSION WITH ANTITHYMOCYTE GLOBULIN

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Purpose: Cytomegalovirus (CMV) is a major cause of morbidity and mortality in cardiac transplant recipients. Use of induction immunosuppression in cardiac transplantation may have an impact on the incidence of CMV. The purpose of this study is to investigate whether antithymocyte globulin (ATG) induction serves as a risk factor for CMV infection and disease in the setting of universal prophylaxis with valganciclovir and maintenance immunosuppression with primarily steroids, mycophenolate mofetil, and tacrolimus. **Methods:** This single center, retrospective cohort study included all adult, de novo cardiac transplant recipients at a tertiary academic medical center between October 2011 and August 2016 with at least 3 months of follow up post cessation of CMV prophylaxis. Exclusion criteria included death during initial hospitalization and receipt of multiple organ transplants. The primary outcome involved comparing the incidence of CMV infection and disease in cardiac transplant recipients receiving ATG induction to those who did not. Secondary outcomes involved comparing the time to CMV infection and disease from initial transplantation and after cessation of CMV prophylaxis. CMV infection was defined as detection of CMV virus in any body fluid or tissue specimen via biopsy or CMV polymerase chain reaction and/or seroconversion. CMV disease was defined as the presence of CMV infection with manifestation of symptoms (fever [temperature greater than 38 degrees centigrade or reported], arthralgias, myalgias, malaise, diarrhea, leukopenia [white blood cell count of less than 3,500 cells/mm³]). Descriptive statistics were used to evaluate baseline demographics and preliminary endpoints. **Results/Conclusions:** Data collection and analysis are currently ongoing. Preliminary results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review the direct and indirect effects of CMV in transplant recipients
Discuss the risk factors for development of CMV infection in transplant recipients

Self Assessment Questions:

Which of the following is an indirect effect of CMV in cardiac transplantation?

- A: CMV myocarditis
- B: Coronary vasculopathy
- C: CMV colitis
- D: Myalgias/arthralgias

Which of the following donor/recipient CMV IgG serostatus is deemed to be at highest risk for CMV disease?

- A: Cmv d+/r+
- B: Cmv d-/r-
- C: Cmv d-/r+
- D: Cmv d+/r-

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-639L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

VETERANS WITH HYPERTENSION HOME TELEHEALTH PROGRAM (VHHTP): A PHARMACY, NURSING COLLABORATION

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Purpose: The purpose of this evaluation is to describe the process of VHHTP and evaluate its impact on Veterans at the FHCC. Hypertension (HTN) affects approximately 79 million American adults and, if uncontrolled, can lead to heart disease and stroke. It is noted that heart disease and stroke were the first and fifth leading cause of death in the United States in 2014. These secondary effects tend to elevate patient and provider costs due to inpatient and follow-up care expenses. Therefore, it is pertinent that proper management of HTN be available. Interventions to expand patient access to HTN care is an increasing topic of quality improvement measures. Several studies have suggested that combined interventions of telemedicine with nurse- or pharmacist-led care may be effective for improving HTN management. **Methods:** A principal goal in the VA Care Coordination Home Telehealth (CCHT) program is to improve clinical outcomes and access to care for Veterans, while reducing complications, hospitalizations and clinic or emergency room visits. The CCHT Program at the Captain James A. Lovell Federal Health Care Center (FHCC) increases access to care for approximately 400 veterans with uncontrolled HTN. The CCHT Nursing staff educate on medication and lifestyle improvement, focusing on individualized patient goals. The limited scope of practice by nursing staff is a challenge for this program, preventing necessary pharmacotherapy modifications. This presents a barrier to timely care, as uncontrolled Veterans are then referred back to their primary care physician (PCP) for medication adjustments. With pharmacists as part of the program, patient centered care can be enhanced by increasing access to care and minimizing delays. The VHHTP is designed as a collaborative team-based approach among Clinical Pharmacy Specialists, Nurses, and Healthcare Providers, intended to reach Veterans that require closer blood pressure monitoring and potential interventions at the FHCC.

Learning Objectives:

Describe measures to establish a collaborative telehealth hypertension clinic with clinical pharmacists, nurses, and medical providers.
Duplicate the process of creating a collaborative telehealth hypertension clinic with clinical pharmacists, nurses, and medical

Self Assessment Questions:

What is the main barrier to establishing a pharmacist-run telehealth HTN clinic?

- A: Primary Care Provider buy-in
- B: Patient/caregiver program participation
- C: Telehealth nursing referrals
- D: Designated pharmacist clinic time

Which listed discipline would be most beneficial for creating a HTN telehealth clinic?

- A: Psychiatry
- B: Nursing
- C: Social Work
- D: Nutrition

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-378L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION OF A DAYS OF THERAPY CLINICAL DECISION SUPPORT TOOL TO FACILITATE PHARMACIST ANTIMICROBIAL STEWARDSHIP EFFORTS IN A COMMUNITY HEALTH SYSTEM

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Purpose: Antimicrobial stewardship programs (ASPs) improve patient outcomes while minimizing unintended consequences of antibiotic use, such as adverse events, emergence of resistant pathogens, and increased health care costs. Advanced tools in electronic health records (EHRs) can be used to enhance ASP efforts and are associated with decreased utilization of broad-spectrum antibiotics, days of therapy (DOT), and antibiotic expenditures. The Infectious Disease Society of America (IDSA) recommends that ASPs implement strategies to limit DOT to the shortest effective duration in order to minimize unnecessary antibiotic exposure. This project will evaluate the addition of a DOT monitoring tool into existing ASP clinical decision support (CDS) tool at a community health system. **Methods:** An antimicrobial DOT monitoring tool available from the EHR vendor was evaluated by infectious diseases (ID) specialist pharmacists and physicians. Components of the tool were customized to meet the needs of this health system, including modifications to the counting rule logic, which antimicrobial classes to include, and display customization. The tool was incorporated in the inpatient EHR into the existing pharmacist patient monitoring workflow. Feedback was obtained from pharmacists and ID specialists over the course of a one-month trial period and the tool was updated accordingly. Antimicrobial usage data will be collected and compared over a two-month period pre- and post-implementation, including broad spectrum antimicrobial use, intravenous doses, oral doses, and DOT per 1000 patient-days. **Results/Conclusions:** This is an ongoing project for which results and conclusion are pending and will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe various strategies used by antimicrobial stewardship programs (ASPs), such as antibiotic timeout, preauthorization, and prospective audit and feedback (PAF)

Identify factors to consider when customizing and implementing a days of therapy (DOT) counting rule in the electronic health record (EHR)

Self Assessment Questions:

Review of antibiotic therapy by pharmacist or infectious disease physician in order to make recommendations to the primary treatment team is a strategy used by antimicrobial stewardship programs (ASPs)

- A Surveillance
- B: Preauthorization
- C: Antibiotic "time out"
- D: Prospective audit and feedback

What is an essential drug-specific factor to consider when customizing and implementing a days of therapy counting rule into the electronic health record (EHR)?

- A Drug dose
- B Frequency of administration
- C Route of administration
- D Indication

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-880L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATING AN EXPANDED VANCOMYCIN DOSING NOMOGRAM IN ACHIEVING TARGET TROUGH CONCENTRATIONS

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Several vancomycin nomograms have been evaluated in the literature. Most, however, are attempts to update target troughs from previous goals of 5-15 mcg/mL to new guideline targets of 15-20 mcg/mL, but do not address whether the nomogram can actually achieve 10-20 mcg/mL concentrations. Likewise, existing nomograms use overall more restrictive inclusion criteria for weight and renal function. The Indiana University Health vancomycin nomogram will be compared to dosing by a clinical pharmacist not following the nomogram for its ability to acquire trough levels suggested by guidelines. Data was collected utilizing a retrospective chart review. The primary endpoint is comparing nomogram dosing to clinical pharmacist dosing outside of the nomogram to achieve vancomycin serum trough levels of 10-20 mcg/mL. The secondary endpoints include nomogram failure due to CrCl, weight, ICU vs. non-ICU status, and whether serum trough levels of 15-20 mcg/mL are achieved. Baseline patient data will be collected including gender, age, height, dosing weight, SCr, CrCl, documented amputation, vancomycin dose (mg/kg/day), and infection source. Patients are included if they are 18 years or older, received parenteral vancomycin for at least 48 hours, and had a steady-state serum trough level drawn after three doses. Patients are excluded if they have CrCl <20 mL/min, have a dosing weight <50 kg or >150 kg, received hemodialysis or continuous renal replacement therapy, have a change in SCr $\geq 1.5\times$ baseline, have a trough drawn more than one hour early or late from the next dose due, or are pregnant. Comparisons will be made using Student's t-test or Chi-squared with a $P < 0.05$. Data collection and analysis is ongoing. Final results will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recall appropriate therapeutic drug monitoring parameters as supported by guideline recommendations

Describe the use of vancomycin dosing nomograms in clinical practice

Self Assessment Questions:

Recent guidelines indicate vancomycin troughs for the treatment of S. aureus infections should remain above what level to avoid development of resistance?

- A 5 mcg/mL
- B: 10 mcg/mL
- C: 15 mcg/mL
- D: 20 mcg/mL

Existing nomograms updated to address revised guideline recommendations attain what range of success rates in both critically ill patients and non-critically ill patients?

- A 0% - 25%
- B 25% - 50%
- C 50% - 75%
- D 75% - 100%

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-544L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

BEST PRACTICE FOR ONCOLOGY FORMULARY MANAGEMENT: IMPLEMENTATION AT A COMMUNITY, NON-PROFIT HEALTH-SYSTEM

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Purpose: Oncology has been one of the most dynamic categories within the United States increased drug spend, with a host of new oral agents leading oncology to trail only rheumatoid arthritis and multiple sclerosis in specialty pharmacy spending. A great deal of published literature supports a more responsible value-based mindset at all levels of care for the treatment of cancer. Due to the changes surrounding reimbursement and the patients view of health care spending, health systems need to adapt and manage the oncology drug spend. Healthcare systems without robust formulary management systems may be left without step-by-step procedures on how to handle high-priced oncology agents in a way that preserves best practice and judicious use. The purpose of this study is to characterize best practice for the design and implementation of an oncology formulary management system within a health system P&T committee. **Methods:** This study, approved by the OhioHealth Institutional Review Board, includes both qualitative and quantitative components. An online survey conducted from November 2016 - January 2017 made up the quantitative portion. The survey was sent to residency program directors of PGY2 Oncology programs throughout the United States. The survey identified key characteristics within individual health systems including, but not limited to: demographics of the institution, existence of oncology P&T subcommittee, existence of a way to manage oncology drug spend, key stakeholders, and inpatient/outpatient volume and infusion characteristics. Willing participants were contacted by telephone between January and February 2017. These meetings included pharmacy personnel and associates and served to further characterize the oncology formulary process at individual health systems. Descriptive statistics will be used to evaluate responses. **Results/Conclusions:** Data collection is currently in progress and will be presented at the GLPRC.

Learning Objectives:

Discuss current value based formulary frameworks available in both the United States and foreign countries.

Describe characteristics of successful oncology P&T committees.

Self Assessment Questions:

Which organization has set forth the "Framework to Assess the Value of Cancer Treatment Options"?

- A: National Comprehensive Cancer Network
- B: American Society of Clinical Oncology
- C: National Cancer Institute
- D: National Institute for Health and Care Excellence

Which of the following disease states ranks above oncology in specialty pharmacy spending?

- A: Hemophilia
- B: End Stage Renal Disease
- C: HIV/AIDS
- D: Rheumatoid Arthritis

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-441L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DOSE-DEPENDENT DIFFERENCES IN SAFETY AND EFFICACY OF QUETIAPINE FOR IMPROVEMENT OF INTENSIVE CARE UNIT (ICU) DELIRIUM

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Purpose: Delirium in ICU patients is associated with poor outcomes. Current guidelines for the management of pain, agitation, and delirium emphasize limited evidence for the use of atypical antipsychotics in these patients. Despite lack of evidence, use of quetiapine for treatment of delirium has become common practice. The goals of this project are to assess current trends of quetiapine utilization for the treatment of ICU delirium at the Clement J. Zablocki VA Medical Center, including dosing efficacy, and length of stay and to provide a quetiapine dosing recommendation to standardize prescribing practices for ICU delirium. **Methods:** A retrospective analysis of quetiapine use for ICU delirium will be performed. Patients who were prescribed at least one dose of quetiapine for delirium while in the ICU from July 1, 2014 to June 30, 2016 will be included for analysis. Patients with an active outpatient quetiapine prescription at the time of admission will be excluded. Confusion Assessment Method for the ICU (CAM-ICU) scores will be assessed to confirm delirium diagnosis. The length of time from delirium diagnosis to first quetiapine dose (less than or greater than 24 hours) and appropriate discontinuation will be recorded to assess current prescribing practices of quetiapine. The efficacy of quetiapine dosing will be determined by analyzing the time to resolution (in days) of delirium based on improvement of CAM-ICU scores. Quetiapine dosing will be measured as a total daily dose divided into three groups: less than or equal to 25mg, 26 to 50mg, or greater than 50mg. Using this data, a quetiapine dosing recommendation will be made to assist ICU providers with safe and effective prescribing practices in the event of ICU delirium. **Results/Conclusion:** Data collection and analysis are in progress; conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe treatment options for intensive care unit (ICU) patients with delirium.

Name the four features assessed by the Confusion Assessment Method for ICU (CAM-ICU) delirium tool.

Self Assessment Questions:

What is the first-line treatment for ICU delirium?

- A: Haloperidol
- B: Supportive therapy
- C: Quetiapine
- D: Restraints

2. Which of the following features must be present for a patient to have a positive assessment (delirium present) for ICU delirium?

- A: Inattention and disorganized thinking
- B: Disorganized thinking and altered level of consciousness
- C: Altered level of consciousness and acute onset/fluctuating course
- D: Acute onset/fluctuating course and inattention

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-379L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

THROMBOEMBOLIC COMPLICATIONS FOLLOWING AMINOCAPROIC ACID USE IN PATIENTS WITH HEMATOLOGIC MALIGNANCIES

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Purpose: Patients with hematological malignancies present with thrombocytopenia secondary to bone marrow involvement and/or the myelotoxic effects of chemotherapy, placing patients at an increased risk for bleeding complications. Aminocaproic acid, an antifibrinolytic drug, may be used to decrease bleeding and reduce transfusion requirements in these patients. However, there is limited data evaluating the safety of this medication, specifically the incidence of thromboembolic complications. The primary objective of this study was to determine the incidence of thromboembolic complications (TEC) following aminocaproic acid administration in patients with hematologic malignancies and evaluate risk factors for developing TEC.

Methods: A retrospective chart review was completed of patients with a primary hematologic malignancy who received oral or intravenous aminocaproic acid for at least 24 hours while admitted to The Ohio State Wexner Medical Center or Arthur G. James Cancer Hospital between October 15th, 2011 and September 30th, 2016. Patients were excluded if they were pregnant, incarcerated, less than 18 or greater than 89 years of age, or receive aminocaproic acid for bleeding complications secondary to trauma or cardiac surgery. The primary outcome was incidence of TEC, defined as a composite of any venous or arterial thrombosis occurring within 14 days from the last dose of aminocaproic acid. This was analyzed using descriptive statistics. Univariate and multivariate logistic regression analysis was conducted to assess the association between developing a TEC and pre-determined patient-specific variables. Other secondary outcomes include the incidence of venous and arterial thromboembolic complications individually and time to development of TEC. An arterial thrombotic event includes: myocardial infarction, ischemic stroke, transient ischemic attack, ischemic bowel, right atrial thrombosis, peripheral vascular event, or intra-abdominal thrombosis. A venous thrombotic event includes: deep venous thrombosis, pulmonary embolism, or cerebral vein thrombosis. **Results/Conclusions:** Data collection and evaluation are currently being conducted. Preliminary results and conclusions will be presented.

Learning Objectives:

Identify a safety concern following the administration of aminocaproic acid in patients with hematological malignancies.

Discuss patient specific risk factors for thromboembolic complications (TEC) following aminocaproic acid.

Self Assessment Questions:

Which of the following is a safety concern following administration of aminocaproic acid?

- A: Angioedema
- B: Thromboembolic complications
- C: QT prolongation
- D: Increased risk of infection

Which of the following patient populations is at highest risk of thromboembolism?

- A: Patients with clostridium difficile colitis
- B: Patients with hematologic malignancies
- C: Patients < 40 with active lifestyles and no prior history of thromboembolism
- D: Patients undergoing a transthoracic echocardiogram (TTE)

Q1 Answer: B Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-922L05-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

A DATA-DRIVEN APPROACH TO REDESIGNING CARTFILLS AND IMPROVING EFFICIENCY OF PHARMACY OPERATIONS

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Purpose: A goal for the pharmacy department is to improve operational efficiency while minimizing costs to the organization. The medication distribution model at this four hospital health system utilizes decentralized automated dispensing cabinets (ADC) and a central pharmacy distribution system, including cartfills. Cartfills prepared in central pharmacy are the primary method for preparing patient specific doses, and comprise of eight percent of doses dispensed. Dispense workload data demonstrated an area of improvement for the timeliness of cartfill doses. Currently, cartfill labels print well in advance of the medication administration time. The objective of this project is to improve the medication distribution model by reducing medication redispenses, returns, and waste. A secondary objective is to improve the number of medications dispensed from ADCs. These changes will allow more time for pharmacy staff to perform other patient care responsibilities without additional resource utilization. **Methods:** A review of inpatient pharmacy dispensing data was performed to identify areas for improvement. The reports of cartfill doses, first doses, and redispenses were utilized to propose a change in the timing and/or number of cartfills. Additional data used for the redesign of cartfills included an analysis of the patterns of medications ordered, administered, and discontinued. A taskforce of pharmacists and pharmacy technicians was established to provide expertise on pharmacy operations. The cartfill changes were tailored to each site with consideration to operations. The medications frequently dispensed from central pharmacy were reviewed for potential addition to ADCs. The processes related to the automated medication carousel were reviewed to optimize inventory management and timely expiration removal processes. **Results and conclusion:** The results will be presented at the 2017 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review current data to redesign cartfill times and/or number of carts at this organization without additional resource utilization.

Describe ways to improve pharmacy operations via inventory stocked in automated dispensing cabinets and carousel.

Self Assessment Questions:

What percentage of hospitals use a decentralized automated system as the primary method for dispensing medication doses according to the 2014 ASHP national survey of inpatient medication dispensing an

- A: 33.3%
- B: 50%
- C: 66.6%
- D: 75%

Which of the following is a benefit of redesigning cartfills?

- A: Increased medication errors
- B: Reduced number of redispenses
- C: Increased pharmaceutical waste
- D: Increased number of discontinued orders that were prepared

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-840L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

MANAGEMENT OF HEPARIN-INDUCED THROMBOCYTOPENIA AT AN ACADEMIC MEDICAL CENTER

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Purpose: Heparin-induced thrombocytopenia (HIT) is an immune-mediated adverse reaction that occurs in up to five percent of patients receiving heparin products. Delay in heparin discontinuation can be life threatening to patients with HIT, while switching to an alternative anticoagulant agent in patients without HIT carries its own risks. This study aims to describe management of HIT at an academic medical center in order to identify opportunities for improvement in HIT management processes. **Methods:** This retrospective, single center study was conducted at The University of Chicago Medicine. Patients 18 years of age and older in whom the development of HIT was suspected between July 2012 and August 2016 were eligible for inclusion. Suspected HIT cases were defined as patients in whom a platelet factor 4 (PF4) enzyme-linked immunosorbent assay (ELISA) was ordered. Patient charts were evaluated using a guideline-based algorithm to determine if appropriate care was provided. Data collection included documented patient-specific characteristics, PF4 assays and serotonin release assays (SRA), timing to discontinuation of heparin and warfarin products, timing to start of an alternative anticoagulant agent, and data regarding proper transition to warfarin. The primary endpoint was the percentage of adult patients with suspected HIT that was appropriately managed. Secondary endpoints for this study include the percentage of adult patients with suspected HIT managed appropriately for each step of care and the percentage of adult patients appropriately managed based upon specific hospital service. **Results and Conclusions:** Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recall pharmacologic agents that can predispose a patient to developing heparin-induced thrombocytopenia

Describe steps in the process of identifying and properly managing a patient with suspected heparin-induced thrombocytopenia

Self Assessment Questions:

Which of the following pharmacologic agents can predispose a patient to developing heparin-induced thrombocytopenia?

- A: Heparin
- B: Enoxaparin
- C: Argatroban
- D: Both answer choices A and B

Which of the following answer choices best describes appropriate confirmation for a diagnosis of heparin-induced thrombocytopenia?

- A: PF4 (+) and SRA (+)
- B: PF4 (+) and SRA (-)
- C: PF4 (-) and SRA (-)
- D: Neither PF4 or SRA sent

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-643L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

NATIONAL EVALUATION OF ANTIBIOTIC PRESCRIBING BY DENTISTS IN THE VETERANS AFFAIRS (VA) HEALTH SYSTEM

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PURPOSE: In the United States, dentists account for about 10% of all antibiotics prescribed in the community. In 2011, 25.6 million antibiotic prescriptions were written by dentists alone. In the Department of Veterans Affairs (VA) Health System, dental benefits are offered to Veterans who meet certain criteria. This network of over 200 clinics, 900 dental providers, and 380 residents and fellows is the largest provider of dental care in the United States and delivers approximately 1.6 million dental visits annually to about 500,000 Veterans. The purpose of this research project was to determine the class and duration of antibiotics, the visit-based antibiotic prescribing rate, and the proportion of antibiotics prescribed for infection prophylaxis and treatment by VA dentists. **METHODS:** A retrospective analysis of national VA dental encounter and pharmacy data for 2013 was conducted. A list of Veterans who visited a dentist and a list of Veterans who received an antibiotic prescription from a dentist before or up to 7 days after the dental visit were generated from the national VA Corporate Data Warehouse (CDW). Veterans who appeared on both lists were included. Treatment was defined as an antibiotic with a days supply > 2 prescribed before the visit with an ICD-9 code suggesting infection, or an antibiotic prescribed up to 7 days post-visit with an ICD-9 code suggesting infection. Prophylaxis was defined as an antibiotic with days supply ≤ 2 prescribed before the dental visit, an antibiotic with days supply ≥ 2 prescribed before the visit without an ICD-9 code for infection, or an antibiotic prescribed up to 7 days post-visit without an ICD-9 code for infection. Other data collected included age, gender, race, ethnicity, and VA region. **RESULTS/CONCLUSIONS:** Research

Learning Objectives:

Discuss the current guideline recommendations regarding antibiotic use for the treatment of oral infections and infection prophylaxis.

Identify the classes of antibiotics, the duration of antibiotics, the indication of antibiotics, and the visit-based rate of antibiotics prescribed by dentists nationally in the VA Health System.

Self Assessment Questions:

Which of the following antibiotic classes is the most commonly prescribed by dentists?

- A: Penicillins
- B: Cephalosporins
- C: Fluoroquinolones
- D: Tetracyclines

Which of the following scenarios is an example of appropriate antibiotic prescribing per current dental guidelines?

- A: Levofloxacin x14 days in a healthy adult patient undergoing tooth extraction
- B: Amoxicillin x7 days in an adult patient with prosthetic joint who is undergoing dental procedure
- C: Amoxicillin x1 dose 30-60 minutes before procedure in an adult patient
- D: Antibiotics are not necessary for any patient undergoing any dental procedure

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-431L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ADVERSE EFFECTS OF INAPPROPRIATELY PRESCRIBED DIRECT ORAL ANTICOAGULANTS

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Purpose: An estimated 5.2 million patients in the United States have atrial fibrillation (Afib), leading to significant morbidity and mortality, with over 750,000 hospitalizations and 130,000 deaths per year. Additionally, venous thromboembolism (VTE) affects up to 600,000 Americans annually, resulting in up to 100,000 deaths per year. Direct oral anticoagulants (DOACs), used for stroke prophylaxis in Afib and for the treatment of VTE, have many advantages over warfarin, including faster onset of action, predictable pharmacokinetics eliminating the need for frequent monitoring, and minimal drug-drug and drug-food interactions. Given these advantages, the usage of DOACs has increased significantly over the last five years. The United States Food and Drug Administration (FDA) approved each DOAC at a specific dose based on patient specific parameters and concomitant medication usage. Patients who are on incorrect doses of DOACs may be at higher risk of adverse events, with increased risk of thrombosis if underdosed and bleeding if overdosed. The purpose of this study is to determine if inappropriate dosing of DOACs contributes to higher rates of adverse events at a large, academic medical center. **Methods:** This single-center, observational, retrospective cohort analysis included patients aged 18 and older with a diagnosis of venous thromboembolism or nonvalvular atrial fibrillation who were prescribed apixaban, dabigatran, or rivaroxaban from Jan 1, 2013 to August 31, 2015. Prescriptions were categorized as appropriately or inappropriately prescribed based on patient specific parameters (renal function, weight, age) and approved FDA doses. The primary endpoint was the composite rate of bleeding and thrombosis with inappropriately dosed DOACs compared to appropriately dosed DOACs. Secondary endpoints included rate of thrombosis, rate of bleeding, reasons for inappropriate dosing, rate of incorrect dose of each DOAC, and prescribing service. **Results and Conclusions:** To be presented at Great Lakes Pharmacy Resident Conference

Learning Objectives:

Discuss advantages and disadvantages of direct oral anticoagulants when compared with warfarin.

Review appropriate doses for apixaban, dabigatran, and rivaroxaban based on patient specific parameters such as age, weight, and renal function.

Self Assessment Questions:

What are potential disadvantages of direct oral anticoagulants when compared to warfarin?

- A: Increased cost
- B: Lack of reversal agents for some direct oral anticoagulants
- C: Increased risk of bleeding and drug-drug interactions
- D: A and B

What is the appropriate dose of apixaban for a 76 year old patient with nonvalvular atrial fibrillation who weighs 51 kg and has a serum creatinine of 1.2 mg/dL?

- A: 2.5 mg daily
- B: 2.5 mg twice a day
- C: 5 mg daily
- D: 5 mg twice a day

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-921L05-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

A TARGETED APPROACH TO CLINICAL PHARMACY SERVICES THROUGH THE USE OF POPULATION HEALTH MANAGEMENT TOOLS

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Purpose: Within healthcare there is an ever-growing paradigm shift away from the practice of reactive medicine towards strategies that leverage predictive/preventive care. Population health management strategies have come to the forefront of healthcare recently for such reasons, as it focuses on the outcomes, and the distribution of those outcomes, for a group of individuals. Pharmacy is well poised to aid in population health management due to the broad set of clinical services that can be provided, such as disease/medication management and adherence counseling. However, identifying populations that may benefit from pharmacy intervention can be a significantly manual process and often reliant on subjective referrals from primary care providers. Tracking interventions and related outcomes is often a manual and time-consuming process as well. Therefore, the focus of this project was to leverage tools developed by population health to facilitate the identification of high risk patients that may benefit from pharmacist intervention, improve documentation of those services, and facilitate the measurement of outcomes. **Methods:** A workgroup was developed to oversee the project and narrow the scope, which was set to focus on diabetes patients. Registry, scoring, and reporting tools within the electronic health record (EHR) were customized in order to develop methods to identify high risk patient populations that may benefit from pharmacy services. In addition, documentation tools were created to streamline clinic workflow and aid in creating discrete data that would otherwise be difficult to extract from notes. Finally, reporting tools were created to enhance metrics and outcomes tracking.

Results/Conclusions: Data collection is in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify population health management strategies

Recognize potential barriers in customizing population health tools for pharmacy services

Self Assessment Questions:

Which of the following are examples of population health management strategies?

- A: Risk-scoring
- B: Outcomes tracking
- C: Disease registries
- D: All of the above

Which of the following are potential barriers in the implementation of population health tools to facilitate targeted pharmacy intervention

- A: Limited buy-in by the pharmacy department
- B: Shortage of data pertinent to pharmacy intervention, such as fill history
- C: Lack of tools within the electronic health record to support these services
- D: Limited need for pharmacy intervention by the health care organization

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-821L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION OF DOSE ROUNDING FOR ONCOLOGY AND NON-ONCOLOGY INFUSIONS

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Dosing for oncology and non-oncology infusions is often weight based, which frequently leads to partial vial usage due to limited vial sizes manufactured. If the vial is a single-use vial and is not completely used, the contents must be discarded. This discarding leads to waste of expensive medication and increased workload due to documentation of waste. Our health-system currently rounds a selection of medications per internal guidelines. These rounding guidelines were added to the electronic health record (EHR) allowing for reduction in manual rounding errors. This methodology was a guide for this project. The primary objective is to determine and implement a process for rounding medications for oncology and non-oncology infusions. The secondary objectives are to assess if the implemented process is reducing cost or reducing waste. First the medications will be identified, which would yield the most benefit for the potential rounding scheme by looking back at dosing data for the previous year. The medications included in this program will be single-dose vials, high-cost, and frequently utilized; those not included will be multidose vials. Rounding algorithms will be developed utilizing the vial size as the basis and presented to physician leaders to garner support and approval. After the algorithms are approved, they will be turned into rounding guides. The guide will be taken to internal committees for approval and implementation into the EHR. Lastly, data will be collected on medication utilization and compared to pre-implementation practice to assess for cost-savings and waste reduction.

Learning Objectives:

Identify the medications that would provide cost-saving benefit from a dose rounding program

Describe the process for implementation of a dose rounding program

Self Assessment Questions:

Which of the following would provide the highest cost-saving benefits from a dose rounding program?

- A Drug Z, single-dose vial, used ~10 vials weekly
- B Drug Y, multidose-vial, used ~10 vials yearly
- C Drug X, prescribed as mg/m², single-dose vial
- D A and C

Which of the following would be a situation that would benefit from a dose rounding scheme?

- A Medication ordered by a physician who does not want the medication
- B A clinical trial medication
- C A medication ordered as mg/kg, supplied only in single-dose vials
- D A pediatric patient's medication, which is outside the protocol

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-735L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATING THE IMPACT OF PHARMACY-LED ADMISSION MEDICATION HISTORY IN PRE-OPERATIVE PATIENTS

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Purpose: The purpose of this quality improvement project is to evaluate the impact of pharmacy-led admission medication history in pre-operative patients on both the accuracy and completeness of the medication list and on pharmacy staffing. Nurses in the pre-surgery area perform the admission medication history for pre-operative patients, while pharmacy staff collects and verifies the medication history for all other hospital admissions. Occurrence reports have been filed from the pre-surgical area describing predominantly errors of omission and incorrect medication or dose. **Methods:** Background data was collected on thirty post-operative total knee or hip arthroplasty patients by repeating the admission medication history post surgically. Potential for process improvement was measured by the number and type of discrepancies found in the pre-surgery medication history compared with that collected by pharmacy staff after surgery. Pharmacy met with nursing management to discuss their current workflow and explore the addition of pharmacy services. As a multi-disciplinary team, we concluded that pharmacy will review the medication history conducted during the pre-operative conversation the day prior to surgery and meet with patients the day of their scheduled surgery to perform an admission medication history. The goal of this pilot program is to develop a process for pharmacy to record the most complete and accurate medication list possible, prior to the patient's admission. Outcomes will be measured by comparing the number and type of discrepancies found in the medication history before and after implementation. Time studies will be conducted during implementation to determine the potential impact on pharmacy staffing. **Preliminary Results:** The most common medication errors found were medication omission and wrong medication dose or directions recorded. Sixteen patients were found to have at least one clinically significant error on their pre-operative admission medication history. **Conclusion:** Final results and conclusion to be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize common categories of errors during the admission medication history process

Identify the importance of utilizing a multi-disciplinary approach for process improvement and the potential differences of a pharmacy-led vs. nursing-led medication history

Self Assessment Questions:

Which of the following is one of the most common errors discovered during the admission medication history process?

- A Wrong administration time
- B Medication omission
- C Missing allergy or adverse drug event
- D Medication listed was never started

Which of the following statements is correct?

- A It is not necessary to have a multi-disciplinary team when piloting
- B The patient interview provides all of the information needed for a medication history
- C Staff should conduct a medication history using closed-ended questions
- D It is important to have dedicated, trained staff performing medication history

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-952L05-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF EMERGENCY DEPARTMENT DISCHARGE ORDER FOLDER ON PRESCRIBING ERRORS

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Purpose: In a pediatric emergency department, a pre-populated discharge order folder was integrated into the electronic medical record to minimize prescription errors. The objective of this study is to compare the rate of prescribing errors pre and post-implementation of the folder.

Methods: A retrospective chart review was conducted of prescriptions written in the pediatric emergency department (PED) from February 1, 2015 - May 31, 2015. Six different medications were selected for review: albuterol, acetaminophen, amoxicillin, ibuprofen, prednisolone/prednisone, and erythromycin. The prescriptions were then divided into two groups, pre and post-implementation and a sample of 200 prescriptions from each group were randomly selected for inclusion. Prescriptions were excluded if the patient was over the age of 18 or not discharged from the PED. Primary end point was the rate of error occurrence between groups. Secondary endpoints include classifying the type of error that occurred, the training level of the physician, error rates within specific commonly prescribed pediatric medications, and the impact of pharmacist presence in the PED on error rates. **Results:** Preliminary results have demonstrated an absolute error reduction rate of 10% when comparing pre-implementation to post-implementation, with an error rate of 23% versus 13% respectively. **Conclusion:** Introduction of the discharge prescription order in the PED has demonstrated a beneficial impact on error rates and should continue to be integrated into practice.

Learning Objectives:

Discuss the incidence of discharge prescription prescribing errors in a pediatric emergency department setting.

Recognize opportunities for pharmacy interventions related to prescription error prevention associated with an electronic medical record customization.

Self Assessment Questions:

A medication error is a preventable event that may cause or lead to inappropriate medication use. Which of the following is an example of a medication error?

- A: Patient breaks out in hives after the nurse administers penicillin.
- B: Patient experiences Red-Man Syndrome after receiving vancomycin.
- C: Patient receives metoprolol succinate after the physician prescribes.
- D: Patient begins to feel short of breath after taking a tablet for Bactrim.

The pediatric population is at increased risk for the occurrence of a medication error upon discharge from an emergency department for which of the following reasons?

- A: There is no increased risk in pediatrics.
- B: Physicians must use weight-based dosing.
- C: All medications only come in one strength.
- D: Dosing does not differ between indications.

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-931L05-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ADHERENCE TO VACCINATION GUIDELINES IN PATIENTS AWAITING KIDNEY OR KIDNEY-PANCREAS TRANSPLANT

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Purpose: Vaccines are a critical component of preventative medicine. Vaccine schedules are recommended by the Advisory Committee on Immunization Practice (ACIP) in order to prevent infections and to avoid potential future complications. While low vaccination rates in the general population are concerning, even more concerning are low vaccination rates in the immunocompromised population due to their increased risk of morbidity caused by common, preventable infections. Vaccinations are less effective when administered after transplant due to the individuals immunosuppressed state; therefore, it is recommended that vaccines are administered prior to transplantation to allow a maximal immune response to develop. Transplant recipients are exposed to the healthcare system during pre-transplant evaluation, while on the waitlist, and after transplant. For these reasons, there are ample opportunities to improve vaccination adherence in transplant candidates. The study aims to describe pre-transplant vaccination rates for pneumococcal and influenza vaccines among adult kidney or kidney-pancreas transplant recipients. **Methods:** A retrospective chart review will include all adult transplant recipients receiving kidney or kidney-pancreas allografts at Cleveland Clinic Main Campus from October 2013 to October 2016. Pre transplant vaccination history, laboratory markers of immunity, baseline demographics, and transplant data will be collected. Vaccination data will be recorded if administration or history of administration is documented in the electronic medical record or Ohio Department of Health Database. The findings will be reported as descriptive statistics; additional univariate and multivariable analyses will be performed where appropriate. **Results and Conclusions:** To be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review the current Advisory Committee on Immunization Practice (ACIP) recommendations for patients with end stage renal disease (ESRD)

Discuss current vaccination rates in the general population and in the transplant population

Self Assessment Questions:

The ACIP recommends the following vaccines for all patients with ESRD with or without hemodialysis:

- A: Pneumococcal 13-valent conjugate vaccine
- B: Pneumococcal polysaccharide vaccine
- C: Human papillomavirus vaccine series
- D: A and B

Which of the following populations are currently meeting the Healthy People Target Goal of 70% for the influenza vaccine?

- A: General population
- B: Kidney recipients
- C: Both A and B
- D: Neither A or B

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-560L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF A PHARMACIST-DRIVEN 24-HOUR AMBULATORY BLOOD PRESSURE MONITORING CLINIC AT A VETERANS AFFAIRS MEDICAL CENTER

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Purpose: Ambulatory blood pressure monitoring (ABPM) is one strategy recommended by clinical guidelines to assess blood pressure (BP) and guide antihypertensive therapy. In comparison to clinic BP readings, ABPM provides more BP measurements throughout the day including nocturnal readings and can be used to confirm white coat hypertension, in addition to other potential indications. Furthermore, ABPM is superior to clinic BP readings in predicting cardiovascular risk. Given the advantages of ABPM, a pharmacist-driven 24-hour ABPM clinic was started in August 2015 at the Veterans Affairs Ann Arbor Healthcare System. The purpose of this project was to review the interventions and recommendations made in the cardiology pharmacy ABPM clinic in order to identify potential areas of improvement. **Methods:** All patients undergoing a 24-hour ABPM study in the cardiology pharmacy clinic were retrospectively reviewed for inclusion. The only exclusion criteria was an unsuccessful 24-hour ABPM study defined as less than 70% satisfactory blood pressure readings during the study. Patient demographics, comorbidities, medication regimens, clinic BP and ABPM study results were collected to characterize the Veteran population being referred to the pharmacy ABPM clinic. Quality assessment measures included percentage of pharmacist recommendations accepted by referring providers, comparison of pre-ABPM and post-ABPM clinic BP readings in patients who had adjustments in antihypertensive therapy, and patients with at least one antihypertensive dosed in the evening. **Results/Conclusions:** As of December 2016, a total of 90 patients had completed a successful 24-hour ABPM study. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review potential indications for a 24-hour ambulatory blood pressure monitoring study

Describe advantages of 24-hour ambulatory blood pressure monitoring in comparison to other blood pressure monitoring techniques

Self Assessment Questions:

Which of the following is true regarding 24-hour ambulatory blood pressure monitoring (ABPM) studies?

- A Useful in diagnosing white-coat hypertension
- B Should not be used in individuals with suspected or diagnosed sleep apnea
- C Allow for measurement of blood pressure during sleep
- D A and C

Based on clinical studies and current guideline recommendations, which of the following is correct?

- A Current guidelines recommend against the use of ABPM
- B ABPM is more costly than other monitoring techniques
- C ABPM is a stronger predictor of cardiovascular risk than clinic measurements
- D ABPM and clinic blood pressure thresholds for hypertension diagnosis are the same

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-614L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

RISK FACTORS FOR SUSTAINED VIROLOGIC RESPONSE IN PATIENTS TREATED FOR HEPATITIS C VIRUS: A DERIVATION CASE CONTROL WITH A VALIDATION COHORT

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Purpose: Chronic hepatitis C virus (HCV) has a significant disease burden in the United States, affecting up to an estimated 3.9 million people. Since 2011, HCV treatment has drastically improved with the introduction of direct-acting antivirals (DAA), which have been shown to achieve a 12-week sustained virologic response (SVR) of up to 99%. Limited data exists on the sub-population of patients who do not achieve SVR on DAA therapy. Henry Ford Health System Pharmacy Advantage is the specialty pharmacy for many of the patients treated for HCV within the health system. As a result, there exists a large amount of data to be interpreted from the inpatient and outpatient setting. There is little published data linking specialty pharmacy services to clinical outcomes, especially adherence. The goal of this study is to characterize the patient population with HCV managed through Henry Ford Health System Pharmacy Advantage and determine factors, including medication adherence, that are associated with SVR. **Methods:** This was an IRB approved retrospective cross-sectional analysis with a derivation case-control and validation cohort. Patients were included if they received HCV treatment with direct-acting antiviral therapy at Henry Ford Health System Pharmacy Advantage, were ≥ 18 years old, and had data available to characterize SVR. Descriptive statistics were used to describe the patient demographics and HCV treatment characteristics. Utilizing the patient population from the cross-sectional analysis, 344 patients (258 who achieved SVR and 86 who did not) were selected for the case-control to identify variables of interest associated with achieving 12-week SVR, with proportion of days covered as the primary variable of interest. A validation cohort was performed utilizing variables identified from multivariable logistic regression to predict 12-week SVR. **Results and Conclusions:** To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the prevalence of chronic hepatitis C infections in the United States

Identify known risk factors associated with failure to achieve sustained virologic response

Self Assessment Questions:

According to the CDC what is the estimated prevalence of chronic HCV infections in the U.S.?

- A <500,000
- B 2–2.5 million
- C 2.7-3.9 million
- D 4-5.6 million

MV is a 74 year old female without cirrhosis who is about to begin treatment for chronic HCV. Which of the following is a known risk factor associated with failure to achieve SVR for this patient?

- A Older age
- B Female gender
- C Noncirrhotic
- D Treatment naïve

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-342L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

REVIEW OF ALVIMOPAN IN PATIENTS UNDERGOING RADICAL CYSTECTOMY IN THE MANAGEMENT OF POSTOPERATIVE ILEUS

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Purpose: Radical cystectomy is an abdominopelvic surgical procedure that can result in a common complication known as ileus. Postoperative ileus is defined as a temporary delay in gastrointestinal (GI) motility that occurs after abdominal surgery and can prolong length of stay (LOS) by approximately 5 days. Contributing factors include endogenous opioid effects on enteric mu-opioid receptors in the GI tract and side effects of opioid analgesics used to treat post-operative pain. Alvimopan is an opioid receptor antagonist that competitively binds to the GI tract -opioid receptors and blocks the peripheral effects of opioids on GI motility and secretion. The primary objective is to evaluate the outcomes of patients undergoing radical cystectomy surgery after the use of alvimopan by analyzing time to GI recovery and total length of hospital stay. The secondary objective is to evaluate compliance with the dosing regimen for each patient. **Methods:** A retrospective review was conducted of patients who underwent radical cystectomy with urinary diversion utilizing bowel who did not receive more than three doses of opioids within 7 days prior to the day of surgery at The Ohio State University Wexner Medical Center (OSUWMC). Using OSUWMCs electronic medical record (EMR), patients receiving more than one dose of alvimopan between April 13, 2016 and October 31, 2016 were identified. A site-specific Alvimopan Medication Tracking Form was completed by the provider and was reviewed to assess if the patients met the pre-procedure dose criteria. This form was evaluated to ensure the patient met all inclusion and no exclusion criterion. **Results and Conclusion:** Data collection and analysis is ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference in April 2017.

Learning Objectives:

Discuss the indications of alvimopan use in surgical patients

Describe the correct dosing regimen for treatment using alvimopan

Self Assessment Questions:

Which of the following is an FDA approved indication for alvimopan?

- A Accelerate the time to upper and lower gastrointestinal recovery for
- B Accelerate the time to upper gastrointestinal recovery following surgery
- C Accelerate the time to lower gastrointestinal recovery following surgery
- D None of the above.

What is the maximum number of doses alvimopan can be administered in-patient?

- A 5
- B 7
- C 10
- D 15

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-770L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF A PROTOCOL IMPLEMENTED FOR THE INPATIENT MANAGEMENT OF ACUTE AGITATION

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Nationally, and at St. Joseph Mercy Hospital Ann Arbor, there are established guidelines for the management of agitated patients in the intensive care unit and for those who are in alcohol withdrawal (CIWA). However, there is no standardized approach on how to manage acutely agitated patients in the hospital outside of these settings. According to a survey distributed prior to the start of this study, 88.1% of nurses said they would feel more comfortable managing agitated patients if there was a protocol to follow. The purpose of this study was to determine if the use of a protocol for the initial management of agitation created by a multidisciplinary team will reduce adverse events, improve appropriate dosing of antipsychotic/anxiolytic medications, and reduce the need for restraints. This study was a retrospective chart review pre-protocol and prospective study post-protocol implementation. Participants included adult patients who had an episode of agitation while in one of the two pilot units. Exclusion criteria included patients being monitored with the CIWA scale or patients who received antipsychotic/anxiolytic medications in other units other than the designated pilot units. The primary objective of this study was to evaluate whether the use of a protocol increases the percentage of patients who receive the optimal initial medication regimen determined by an algorithm. Secondary objectives include evaluating the percentage of patients requiring restraints, the mean number of hours patients are on restraints, the impact on patient safety (QTc prolongation and falls), the change in the number of "as needed" doses of anxiolytics/antipsychotics, adherence to the agitation treatment protocol, and the impact the protocol has on nursing perception and comfort in managing acutely agitated patients (via anonymous pre- and post- protocol implementation surveys). The results of this study are pending.

Learning Objectives:

Recognize challenges in the treatment of an acutely agitated patient in the inpatient setting, outside of the intensive care unit or patients who are in alcohol withdrawal.

Identify patient characteristics that should be considered when choosing a medication for the treatment of an agitated patient.

Self Assessment Questions:

Which of the following statements is correct in regards to managing an agitated patient?

- A Restraints can be harmful to patients and they also can consume time
- B Antipsychotic and anxiolytic medications have minimal side effects
- C Intravenous and intramuscular routes of administration are preferred
- D Agitation is benign and self-limiting with time

Which of the following patient characteristics or lab values should be considered when choosing a medication for the treatment of an agitated patient?

- A White blood cell count
- B Sedimentation rate
- C QTc
- D Prothrombin time

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-459L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF THE MANAGEMENT OF TYPE-2 DIABETES MELLITUS OUTPATIENT INSULIN USERS IN AN INPATIENT SETTING WITHIN A VETERANS AFFAIRS MEDICAL CENTER

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Purpose: Maintaining blood glucose control in the inpatient setting is associated with decreased mortality, shorter lengths of stay, and lower complication rates. However, literature regarding inpatient insulin requirements of type 2 diabetic outpatient insulin users is unclear. This study aims to determine inpatient insulin dosing for patients managed with insulin in the outpatient setting and analyze resultant glycemic control while looking to either provide clinical evidence to support the practice of decreasing insulin doses upon admission or contribute an alternate inpatient insulin management strategy to better guide future practice. **Methods:** The study is a retrospective case-series utilizing database analysis and chart review. The computerized patient record system (CPRS) will be reviewed for type 2 diabetics admitted between 1/1/2013 and 12/31/2015 who filled an outpatient prescription for either basal/ bolus or premixed 70/30 insulins within 90 days before admission. The following data will be collected: patient demographics (age, race, weight, height, BMI, diagnosis of renal or cardiovascular disease), admitting diagnosis, HbA1c% pre- and post-hospitalization, insulin total daily doses before, during, and after hospitalization, blood glucose levels classified as low (<70mg/dL), target (70-180mg/dL) high (181-300mg/dL) and very high (>300mg/dL), administration of dextrose, glucose, or glucagon for hypoglycemic episodes, length of stay, and pertinent concomitant medications (angiotensin-converting enzyme inhibitors, angiotensin receptor blockers, beta-blockers, antibiotics, corticosteroids atypical antipsychotics, non-insulin anti-hyperglycemics, HGM-CoA reductase inhibitors, aspirin, and medication for the treatment of diabetic neuropathy). Patients will be stratified according to their HbA1c% prior to admission (<8, 8-8.99, >9). Total daily doses will be calculated as total units administered during admission divided by length of stay and inpatient glycemic control will be measured by the percentage of time patients spend hypoglycemic, hyperglycemic, and within target glycemic range. **Results:** Data collection and analysis are ongoing and will be presented at the 2016 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify medications and disease processes that can negatively impact inpatient blood glucose control

Recall preferred insulin regimens in the inpatient setting

Self Assessment Questions:

Which of the following patients would likely experience hyperglycemia in the inpatient setting?

- A A 72-year-old female receiving amiodarone for acute onset atrial fibrillation
- B A 76-year-old male receiving prednisone for a COPD exacerbation
- C A 44-year-old female receiving enoxaparin for deep vein thrombosis
- D A 21-year-old male receiving hydromorphone for a fracture

Which of the following insulin regimens is strongly discouraged in the inpatient setting?

- A Basal, mealtime, and correction-dose insulin
- B Basal insulin only
- C Sliding scale insulin only
- D Basal and correction-dose insulin

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-689L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT ON RENAL FUNCTION AND TOLERABILITY OF EVEROLIMUS BASED IMMUNOSUPPRESSION IN ADULT THORACIC TRANSPLANT PATIENTS

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Purpose: Everolimus based immunosuppression is increasingly utilized off-label in heart and lung transplant patients due to a different adverse effect profile than standard first-line immunosuppressive therapy with tacrolimus, mycophenolate, and prednisone. Everolimus may benefit post-transplant patients with renal dysfunction, malignancy, cytomegalovirus infection, cardiac allograft vasculopathy, or bronchiolitis obliterans syndrome. The purpose of this study was to assess the safety and efficacy of everolimus based immunosuppressive therapy in heart and lung transplant patients. **Methods:** This retrospective chart review included adult heart or lung transplant patients who were started on everolimus at Spectrum Health with at least 90 days of follow-up. The primary objective was to assess the change in estimated glomerular filtration rate utilizing the Modification of Diet in Renal Disease equation, from baseline to 3 months post-everolimus initiation. Secondary objectives compared prior to and after everolimus initiation include: need for renal replacement therapy, frequency and grade of rejection, presence of donor specific anti-human leukocyte antigen antibodies, occurrence and type of infection, incidence of malignancy, cardiac allograft vasculopathy, and bronchiolitis obliterans syndrome. Baseline and serial assessment for dyslipidemia, leukopenia, neutropenia, proteinuria, edema, and delayed wound healing was conducted to assess tolerability of everolimus. **Results/Conclusions:** Full results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recall possible benefits of utilizing everolimus in heart or lung transplant patients

List potential adverse events associated with everolimus use in heart or lung transplant patients

Self Assessment Questions:

What is a benefit to utilizing everolimus in heart or lung transplant patients?

- A increase in bronchiolitis obliterans syndrome
- B lipid lowering effects
- C decrease in leukopenia episodes
- D decrease in blood pressure

What is an adverse event associated with everolimus use?

- A increase in cytomegalovirus infections
- B edema
- C dry cough
- D reduction in cardiac allograft vasculopathy

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-644L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EFFICACY OF LEUPROLIDE DEPOT GIVEN MONTHLY VERSUS EVERY THREE MONTHS IN COMBINATION WITH AN AROMATASE INHIBITOR.

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Purpose: Leuprolide acetate Depot (Lupron) is an intramuscular injection that is currently used off-label for premenopausal ovarian ablation in women with breast cancer who are estrogen receptor positive and on an aromatase inhibitor. There have been several studies to date that have established the safety and efficacy of leuprolide acetate depot injection, but none of these studies have compared the efficacy of monthly versus every three month formulations in combination with an aromatase inhibitor. This study aims to compare once monthly leuprolide depot to every three-month leuprolide depot in combination with an aromatase inhibitor in premenopausal women with estrogen receptor positive breast cancer. **Objective:** The primary objective of this study is achievement of ovarian ablation. The secondary objectives include progression free survival, overall survival at one year, FSH levels, estradiol levels, and safety outcomes. **Methods:** This is a single center retrospective case-controlled study performed at the Indiana University Melvin & Bren Simon Cancer Center. Chart reviews will be based off a Cerner generated of patients treated in the infusion center. Baseline characteristics will be recorded for all patients including age, stage of breast cancer, if previous chemotherapy had been given, lymph node status, tumor size, HER-2 status, and number of previous endocrine therapies. Patients are then separated into two arms; those who received monthly leuprolide depot injections and those who received every three-month leuprolide depot injection both in combination with an aromatase inhibitor. **Results:** Ovarian ablation is defined as an estradiol concentration less than 40 pg/mL and an FSH concentration of 23-116 mU/mL. Progression of disease within the first year of therapy is defined as disease progression or death. Overall survival at one year after initiation of leuprolide acetate will be analyzed. **Conclusions:** Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference annual meeting.

Learning Objectives:

Review the mechanism of action and FDA indications of leuprolide acetate depot.

Discuss current literature supporting the use of leuprolide acetate depot in breast cancer treatment.

Self Assessment Questions:

All of the following are FDA approved indications of leuprolide acetate EXCEPT:

- A: Advanced prostate cancer
- B: Premenopausal ovarian suppression in breast cancer
- C: Endometriosis
- D: Uterine fibroids in combination with iron

When ovarian suppression combined with tamoxifen was compared to tamoxifen alone for the treatment of hormone-receptor-positive early breast cancer in premenopausal women, the results showed there was

- A: Superior disease free survival in the combination group
- B: Inferior disease free survival in the combination group
- C: Combination therapy was no different than tamoxifen alone for disease free survival
- D: None of the above

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-654L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF AMBULATORY CARE PHARMACISTS ON HEALTH PLAN MEDICAL COSTS

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Purpose: Healthcare expenditures in the United States continue to rise, with the most recent data showing a greater than 5 percent increase in expenditures from 2013 to 2014. Due to these increased costs, insurers are looking for ways to lower member healthcare costs. Involving pharmacists in the care of these members may be an effective option, as pharmacist interventions have shown to produce positive clinical and economic effects in multiple healthcare settings. Community Health Network (CHNw), a self-insured employer, offers a health wellness program to employees and employee spouses or dependents with certain chronic disease states. A requirement of this program is to meet with a pharmacist in a primary care clinic. The purpose of this program is to utilize pharmacists as a way to improve patient health outcomes and decrease patient healthcare spending. As CHNw is looking to expand pharmacy services, available financial and clinical data need to be evaluated to determine if there is a positive return on investment for this program. By evaluating return on investment data from this program, CHNw can develop a plan for future program services. **Methods:** A retrospective, observational chart review will be performed using CHNw's electronic medical record. Patient utilization and cost data will be evaluated from reports generated by the network insurance provider. Data will be collected on all patients with CHNw insurance that have an active diagnosis of asthma during the study period. Data from patients enrolled in the health wellness program will be compared to data from patients not enrolled in the program. **Results/Conclusion:** Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify factors that can contribute to healthcare costs

Describe the role of pharmacists working under a collaborative drug therapy management (CDTM) agreement

Self Assessment Questions:

Which of the following factors has the largest impact on healthcare costs?

- A: Dental services
- B: Hospital care
- C: Physician and clinical services
- D: Prescription medications

Which of the following tasks is most likely to be performed by a pharmacist working under a collaborative drug therapy management (CDTM) agreement?

- A: Diagnosing a patient with anemia based on the results of a complete blood count
- B: Drawing the blood for a CBC lab
- C: Ordering a blood transfusion based on results of a CBC lab
- D: Placing a lab order for a CBC

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-849L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

A RETROSPECTIVE CHART REVIEW OF THE COST IMPACT OF PHARMACIST INTERVENTION IN A COMMUNITY INPATIENT BEHAVIORAL HEALTH UNIT: A PILOT STUDY

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Purpose: Admission to a behavioral health unit is associated with significant costs. Existing studies focus on reducing overall cost of admission versus the cost of medications associated with treatment. The current staffing model at Marion General Hospital does not involve significant pharmacy collaboration with providers in the behavioral health unit. It is hypothesized that increased pharmacist monitoring of psychiatric medications should reduce side effects, eliminate duplicate therapy and optimize patient care. The objective of this study is to evaluate the total cost reduction of inpatient medications in the behavioral health unit after establishing a dedicated pharmacy presence.

Methods: A retrospective chart review was conducted on patients 18 years of age and older, who were admitted to a 26-bed acute inpatient psychiatric unit at a community hospital with a primary diagnosis of depression/anxiety, schizophrenia/schizoaffective disorder, or bipolar disorder. Exclusion criteria included patients younger than 18 years old or admitted to a medical unit. The pre-intervention time period was June 1, 2016 to July 31, 2016 and the pharmacy involvement occurred from August 1, 2016 - September 30, 2016. During the pharmacy intervention period, a pharmacy resident and an Advanced Pharmacy Practice Experience student were dedicated to reviewing behavioral health patient profiles and making medication recommendations to reduce polypharmacy. The cost of each psychiatric medication will be evaluated and multiplied by the total number of administrations for each patient. Trends will also be assessed between the study groups, including psychiatric diagnoses, types of psychiatric medications, number of psychiatric doses administered, number and types of pharmacy interventions, length of stay and comorbidities. Results and conclusions will be presented at the 2017 Great Lakes Residency Conference.

Learning Objectives:

Explain the importance of the pharmacists role in caring for patients in the behavioral health unit

Discuss the different factors that can affect the cost of medications

Self Assessment Questions:

Existing studies focus on cost reductions related to which of the following?

- A Medications
- B: Readmission rates
- C: Overall admission
- D: Pharmacy interventions

Which medication was considered a potential confounding factor and was accounted for prior to data collection?

- A Paliperidone palmitate injection
- B Risperidone injection
- C Aripiprazole lauroxil injection
- D Haloperidol decanoate injection

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-881L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PHARMACIST-DRIVEN PRE-EXPOSURE PROPHYLAXIS (PREP) MANAGEMENT FOR PATIENTS AT HIGH HIV ACQUISITION RISK

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Pre-exposure prophylaxis (PrEP) has been pivotal in preventing the spread of human immunodeficiency virus (HIV) among patients who are at high HIV acquisition risk. However, PrEP is underutilized in this patient population partially due to lack of provider and patient awareness. Many PrEP patients at UW Health are initially managed by clinicians in the HIV Clinic, but workload limitations and inadequate technology lead to occasional gaps in therapy. The purpose of this project is to improve both PrEP management and medication access through the implementation of a pharmacist-run PrEP management clinic and electronic health record (EHR) tracking tools. Initially, a gap analysis was performed and the current demand for PrEP management was assessed. Pre-implementation data was collected. A delegation protocol was approved to support PrEP laboratory and medication ordering by designated pharmacists. EHR tools will be created to support patient enrollment, tracking, and risk assessment of PrEP. Pharmacist and other provider workflows will be redesigned and pharmacist management of PrEP will be piloted in the HIV Clinic. After workflows are established in the HIV Clinic, select primary care providers (PCPs) will be trained to refer patients to the pharmacist-run PrEP management clinic. Workflows of PrEP referrals from PCPs will be piloted and post-implementation data will be collected. Results will be reported in terms of "management" and "access" endpoints measured pre and post implementation of the pharmacist service. Management-related endpoints include clinic relative value units (RVUs), gaps in therapy, and medication adherence. Access-related endpoints include need/demand for PrEP, patient enrollment, and time from first PrEP appointment to HIV test result and to written prescription. Pharmacist management of PrEP therapy has the potential to improve adherence, reduce gaps in therapy, and increase patient access to care.

Learning Objectives:

Recognize the importance of medication adherence for PrEP therapy efficacy

Identify common errors and assess opportunities for pharmacist involvement in PrEP management

Self Assessment Questions:

In what way(s) can pharmacists make an impact in PrEP management?

- A Medication adherence counseling
- B: Conducting patient risk reassessment consultations
- C: Proactive refill and lab monitoring
- D: All of the above

What was the most common error in PrEP management?

- A Delay in time from first PrEP appointment to first prescription fill
- B Prescriptions provided for more than 3 months
- C Long interval between HIV lab visits
- D Patients stopping therapy

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-715L02-P

Activity Type: Knowledge-based Contact Hours: 0.5
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IMPACT OF PHARMACY-DRIVEN EDUCATION ON ANTIBIOTIC PRESCRIPTION RATES FOR ACUTE UNCOMPLICATED BRONCHITIS IN EMERGENCY DEPARTMENT PATIENTS

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Purpose: With rates of antibiotic resistance rising and increasing reports of antibiotic associated illnesses, antibiotic use should be reserved for patients who present with a bacterial infection. One area where prescribing of antimicrobials is common is in the treatment of uncomplicated bronchitis. The National Institute for Health and Care Excellence (NICE) recommendations for the treatment of uncomplicated bronchitis suggest abstaining from prescribing antibiotics due to high rates of viral etiology, and instead focus on symptomatic relief with agents such as bronchodilators, antitussives, and anti-inflammatory agents. This study will determine the impact of providing pharmacy-driven education regarding appropriate antibiotic prescribing for acute uncomplicated bronchitis to providers and patients on antibiotic prescription rates and rate of patient reconsultation. **Methods:** A retrospective chart review will be conducted of emergency department (ED) visits at HSHS St. Johns Hospital due to uncomplicated bronchitis. Patients will be identified using ICD 9 code 466.0 (acute bronchitis). The first phase of the study will collect data from September 1, 2014 through September 1, 2016 prior to provider education regarding proper antibiotic use for acute uncomplicated bronchitis. This data will be compared to ED visits of patients from December 1, 2016 through May 31, 2017 after provider education has been completed. Patient characteristics to be evaluated in the study include gender, age, past medical history, tobacco use, illness characteristics, duration of illness, antibiotic prescribed (if applicable), duration of prescribed antibiotic therapy and necessity of reconsultation within 3 weeks of original treatment of patient illness. The primary outcome of this study will compare the rates of antibiotic prescribing from before and after provide education. The secondary outcome will assess reconsultation rates. Increasing patient education and alerting them of the expected duration of illness is hypothesized to decrease reconsultation rates in the ED. **Results:** On-going **Conclusion:** In progress

Learning Objectives:

Recognize pertinent patient history that would merit antibiotic therapy.

Identify potential strategies for minimizing inappropriate antibiotic prescriptions for patients presenting with uncomplicated acute bronchitis

Self Assessment Questions:

1. Of the following, who would require antibiotic therapy if presenting to the emergency department and diagnosed with acute bronchitis?

- A: 23 year old male with a history of asthma
- B: 67 year old male with 22 pack year smoking history and severe ch
- C: 87 year old female on chronic steroids for Crohn's disease
- D: 58 year old male NYHA grade 3 congestive heart failure patient wi

Of the following, which most accurately describes the impact of each antibiotic prescribing strategy?

- A: POC tests increase antibiotic prescribing rates
- B: POC tests decrease patient reconsultation
- C: Physician education decreases antibiotic prescribing
- D: B and C

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-857L04-P

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OPTIMIZING DISPLAY OF MEDICATION ADMINISTRATION INFORMATION FOR CLINICIANS IN AN ELECTRONIC HEALTH RECORD

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The electronic health record (EHR) with clinical decision support (CDS) has shown to help reduce the number of errors related to the ordering and administration of medications. Human factors principles, which take into account how clinicians interact with the EHR, have been used to determine the most effective method to display medication information. Incorporating human factors and human-computer interface in development of CDS is pertinent to patient care and reducing medication errors. Engaging clinicians from multiple disciplines in the development of CDS is essential to ensure medication information is relayed to the appropriate clinician at the right time. The goal of this project is to optimize the location of information related to medications. This is an effort to standardize the display of information for future medication orders. This project is a quality improvement project and exempt from review by the Institutional Review Board. A report of information currently displayed on the medication administration record (MAR) of formulary medications was generated. The data were reviewed and divided into categories based on their purpose and intended audience. Display options within the EHR for each category were explored. Potential changes in location of medication information were then analyzed. The proposed changes in display of medication information are to be reviewed by a multidisciplinary taskforce consisting of pharmacists, nurses, an information technology specialist, and a hospitalist. The data collected will be used to aid in standardization of future medication orders in addition to optimizing display of current medication administration instructions. Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize to use clinical decision support, taking into account human factors, and the human-computer interface to optimize administration instruction locations.

Identify options in the electronic health record that can be used for information associated with medication orders.

Self Assessment Questions:

1. Which of the following is essential in developing effective clinical decision support? Choose the best answer.

- A: Nurses
- B: Pharmacists
- C: Multidisciplinary staff
- D: Computerized alerts

2. Which of the following may arise from ineffective clinical decision support implementation?

- A: Alert fatigue
- B: Barcode scanning
- C: Unit dose dispensing
- D: Single screen view

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-839L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF PHARMACIST-LED MEDICATION DISCHARGE COUNSELING AND FOLLOW-UP CALLS ON MEDICATION ADHERENCE RATE AMONG PATIENTS WITH CEREBROVASCULAR ACCIDENT (CVA) AND TRANSIENT ISCHEMIC ATTACK (TIA)

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Background: Cerebrovascular accidents (CVA), including ischemic and hemorrhagic strokes, and transient ischemia attacks (TIA) are the third most common cause of death in the United States with a recurrence rate of 10 to 20 percent within 90 days from an initial episode. Medication adherence is essential for the secondary prevention of CVA and TIA, and non-adherence to medication is a risk factor for recurring vascular events or death. At Cabell Huntington Hospital, patients who are admitted with primary diagnosis of initial or recurrent CVA or TIA receive general discharge counseling performed by nurses. The purpose of the study is to assess the influence of pharmacist-led discharge medication counseling and follow-up calls after CVA and TIA on medication adherence and rate of re-hospitalization within 30 days post-discharge.

Methods: This is a prospective single-center study that will include patients at least 18 years of age admitted to Cabell Huntington Hospital (CHH) with primary diagnosis of initial or recurrent CVA or TIA between January 2017 and March 2017. Patients who are discharged or transferred to other healthcare facilities or have less than 48 hours of hospitalization are excluded. Patient meeting inclusion criteria will receive pharmacist-led detailed medication discharge counseling in addition to routine discharge counseling performed by nurse. Between 7th and 10th day post-discharge, patient will receive a follow-up call and will be asked a series of questions regarding medication adherence using Morisky Medication Adherence Scale (MMAS-8). MMAS-8 is a validated self-report measure for medication adherence among patients with chronic condition. The primary outcome is the rate of medication adherence measured by MMAS-8. The secondary outcome is the rate of re-hospitalization within 30 days post-discharge. Summary of results: Data is being collected at this time. Conclusions: Not available

Learning Objectives:

Identify various factors that may affect the medication compliance among patients with strokes in community setting.

Describe a role and impact of pharmacist during discharge counseling among patients with CVA or TIA.

Self Assessment Questions:

Which of the following is a modifiable risk factor in reducing the risk of recurrent stroke?

- A: Gender
- B: Age
- C: Medication compliance
- D: Heritage

Which of the following statement is correct regarding patients who experience CVA or TIA?

- A: Patients who experience CVA or TIA usually do not have other comorbidities
- B: Medication adherence rate is high among this patient populations
- C: Cost of medication does not affect the medication adherence rate
- D: Patients' incomplete understanding of medication can affect medication adherence

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-740L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ALL-CAUSE HOSPITAL READMISSION RATE AND ITS RISK FACTORS AMONG PATIENTS WITH CEREBROVASCULAR ACCIDENTS(CVA) AND TRANSIENT ISCHEMIC ATTACK (TIA)

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Background: Cerebrovascular accidents (CVA), including ischemic and hemorrhagic strokes, and transient ischemia attacks (TIA) are the third most common cause of death in the United States with a recurrence rate of 10 to 20 percent within 90 days from an initial episode. Currently, there is limited data available on factors associated with 30-day or 90-day readmissions among patients with stroke and other cerebrovascular disease. The purpose of the study is to identify all-cause 90-day hospital readmission rate among patients with initial or recurrent CVA or TIA and to identify patient populations and/or risk factors who are at high risk of readmission. Result of this study will be used to further identify patient populations who may benefit the most with additional medication discharge counseling and/or interventions performed by a clinical pharmacist.

Methods: This is a retrospective chart review of all patients who are 18 years of age or older admitted to Cabell Huntington Hospital (CHH) in Huntington, West Virginia with at least 24 hours of hospital stay and primary diagnosis of initial or recurrent CVA or TIA between October 2015 and October 2016. Patients who are discharged to skilled nursing facilities or expired during hospitalizations are excluded. The primary outcome is the 90-day all-cause readmission post-CVA or TIA event. The secondary outcome will include baseline characteristics such as comorbidities, presence of polypharmacy, insurance payor type, and presence of pertinent medication classes such as antiplatelet, statins, etc. These factors will be used to potentially identify patients who may be at higher risk of hospital readmission.

Results and conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify all-cause 90-day hospital readmission rate among patients with cerebrovascular accidents and transient ischemic attack

Describe risk factors for hospital readmission and patient population who may benefit the most from additional medication discharge counseling and/or other interventions performed by a clinical pharmacist

Self Assessment Questions:

Which of the following is a risk factor for both ischemic stroke and hemorrhagic stroke?

- A: cigarette smoking
- B: trauma
- C: women
- D: cancer

The risk for recurrent stroke is highest during the first

- A: 3 months
- B: 6 months
- C: 12 months
- D: 18 months

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF CURRENT SPECIALTY PHARMACY SERVICES IN A MULTI-HOSPITAL COMMUNITY HEALTH SYSTEM TO STANDARDIZE WORKFLOW AND OPTIMIZE CURRENT SPECIALTY PHARMACY SERVICE MODEL

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Purpose: This project will evaluate the workflows and business models of current specialty pharmacy service lines within a multi-hospital health system. This evaluation will be used to consider changes in the current practice model by developing strategies to standardize workflows across multiple sites and determine if optimization of specialty pharmacy dispensing functions would benefit the health system financially. **Methods:** Currently within the multi-hospital health system, prescriptions for specialty medications are dispensed from three outpatient oncology pharmacies and four hospital outpatient pharmacies. The existing workflow for specialty medication dispensing, completed by pharmacists located within each pharmacy, consists of benefit investigation, prior authorization submission, medication procurement, and patient follow-up after treatment initiation. However, inconsistencies are present between the multiple sites. The workflow at each site will be evaluated, and potential models will be developed to standardize workflow, optimize patient care, and provide opportunities for pharmacists to perform additional clinical duties. This evaluation will include the comparison of staffing and training requirements, pharmacist responsibilities, and advantages and disadvantages between the different models to determine feasibility of each option. Workflow and fiscal implications will also be analyzed to determine if the models would benefit the health system financially. Surveys to pharmacists and prescribers in the clinics will be conducted prior to and following implementation of any changes brought forth by the evaluation. **Results/Conclusions:** Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe potential contributions of a clinical pharmacist who is embedded inside of a specialty clinic
Identify additional requirements in order to dispense a specialty medication at a pharmacy

Self Assessment Questions:

Potential benefits to having a clinical pharmacist embedded within a specialty clinic include all of the following except:

- A: Increase in patient safety
- B: Decrease in medication copays
- C: Increase in medication adherence
- D: Interdisciplinary collaboration of patient care

Many specialty pharmaceuticals require a _____ to be submitted to the insurance company before the medication can be dispensed at a pharmacy.

- A: Prior authorization
- B: Hard copy of the prescription
- C: Copy of all of the patient's prior and current medications
- D: Letter written by the physician

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-748L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

UNFRACTIONATED HEPARIN VERSUS BIVALIRUDIN IN PATIENTS WITH ST-SEGMENT ELEVATION MYOCARDIAL INFARCTION UNDERGOING PRIMARY PERCUTANEOUS CORONARY INTERVENTION: A RETROSPECTIVE REVIEW

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Purpose: ST-segment elevation myocardial infarction (STEMI) affects many Americans each year and requires emergency medical care. Patients presenting with STEMI often undergo emergent primary percutaneous coronary intervention (PCI) to open up the blocked vessel(s). During primary PCI, current ACC/AHA guidelines recommend the use of either bivalirudin or unfractionated heparin as the anticoagulant of choice. Recent studies have shown that bivalirudin and unfractionated heparin do not differ significantly in efficacy or safety, compared to trials in the past which showed more favorable outcomes for bivalirudin in STEMI. The primary objective of this study is to compare the efficacy and safety of bivalirudin and unfractionated heparin administered during primary PCI for patients presenting with STEMI at Bronson Methodist Hospital. **Method:** This is a retrospective chart review which will include patients with STEMI who receive either unfractionated heparin or bivalirudin during primary PCI at Bronson Methodist Hospital. The primary efficacy outcome of this study is to compare the proportion of patients receiving unfractionated heparin or bivalirudin who had at least one major adverse cardiac event (MACE) at 30 days. MACE is defined as a composite of all-cause mortality, cerebrovascular accident, reinfarction / stent thrombosis, or additional unplanned target lesion revascularization. The primary safety outcome of this study will compare major bleeding rates at 30 days. **Results/Conclusions:** Data collection and analysis are ongoing. Results are conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain the role of bivalirudin and unfractionated heparin in the setting of primary percutaneous coronary intervention (PCI) for STEMI patients.
Discuss the results of recent studies comparing bivalirudin and unfractionated heparin in STEMI patients undergoing primary PCI.

Self Assessment Questions:

What is the main role of bivalirudin and unfractionated heparin in STEMI patients undergoing primary percutaneous coronary intervention (PCI)?

- A: Antiplatelet therapy to decrease platelet adhesion in the vessels
- B: Anticoagulant therapy to inhibit or inactivate thrombin generation
- C: GP IIb/IIIa receptor antagonism to block platelet aggregation
- D: Fibrinolytic therapy to bind to fibrin in a thrombus and convert entrapped red blood cells to free-flowing blood

Based on the results of the study, what did the authors of the HEAT-PPCI trial recommend for STEMI patients undergoing primary PCI?

- A: The use of unfractionated heparin with selective use of GP IIb/IIIa
- B: Bivalirudin should be used in all PCI cases over unfractionated heparin
- C: Bivalirudin decreases the risk of mortality compared to unfractionated heparin
- D: Eptifibatide, when added on to unfractionated heparin or bivalirudin

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-598L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EFFICACY AND SAFETY OF INHALED NITRIC OXIDE COMPARED TO INHALED EPOPROSTENOL IN PATIENTS WITH ACUTE RESPIRATORY DISTRESS SYNDROME

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Acute respiratory distress syndrome (ARDS) is a clinical syndrome that may lead to respiratory failure and increased mortality. The management of ARDS consists of supportive care including the treatment of underlying causes, use of prone positioning, mechanical ventilation, fluid restriction and neuromuscular blockers. Salvage pharmacotherapy includes inhaled vasodilators such as nitric oxide and epoprostenol. In patients with ARDS, inhaled nitric oxide (iNO) has demonstrated significant improvement in oxygenation without a benefit in mortality. Inhaled epoprostenol (iEPO) has been proposed and studied as an alternative agent to iNO due to a similar efficacy and adverse event profile. In December 2016, Mount Sinai Hospital implemented iEPO as a replacement to iNO. The objective of this study is to compare the efficacy and safety of iNO versus iEPO in adult medical intensive care unit (MICU) patients with ARDS. This is a retrospective, cohort study reviewing the use of iNO compared to iEPO in patients admitted to the MICU between January 2014 and April 2017. iNO data was collected between January 2014 and December 2016. iEPO data will be collected after implementation in December 2016. The following data was collected using the electronic medical record: age, gender, weight, arterial blood gas, history of chronic respiratory disease, utilization of conventional therapy, dose and duration, ICU and hospital length of stay, duration of mechanical ventilation and mortality. The primary outcome of the study is number of ventilator-free days post-initiation of medications. The secondary outcomes include change in partial pressure of oxygen in arterial blood (PaO₂), PaO₂ over fraction of inspired oxygen (PaO₂/FiO₂) ratio, mortality, and cost. Preliminary results: Mean ventilator-free days for iNO was 2.6. Median PaO₂/FiO₂ ratio change after 24 hours of iNO initiation was 22 mmHg. Median duration of iNO therapy was 51.3 days. Median cost of iNO treatment was \$7,695 per patient.

Learning Objectives:

Recognize the appropriate initial dose of inhaled epoprostenol
Discuss the efficacy and safety of inhaled nitric oxide versus inhaled epoprostenol

Self Assessment Questions:

Which of the following statement is true?

- A Inhaled vasodilators are the first line therapy in acute respiratory distress
- B: Inhaled epoprostenol improves mortality in acute respiratory distress
- C: Inhaled epoprostenol improves oxygenation
- D: Inhaled nitric oxide is a powder to be reconstituted for inhalation

What is the appropriate rationale to replace inhaled epoprostenol with inhaled nitric oxide?

- A Inhaled epoprostenol has shown greater improvement in oxygenation
- B Inhaled nitric oxide has shown more adverse effects than inhaled epoprostenol
- C Inhaled epoprostenol has more prolonged oxygenation effect
- D Inhaled epoprostenol has more cost savings potential compared to inhaled nitric oxide

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-538L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

MANAGEMENT OF REFRACTORY STATUS EPILEPTICUS AT A CHILDREN'S HOSPITAL

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Purpose: Midazolam and pentobarbital are commonly used as continuous infusion anesthetics for the management of refractory status epilepticus (RSE). While these agents provide effective seizure control, they are associated with several adverse effects, such as hypotension requiring vasoactive agents, respiratory depression, and infection, which may negatively impact morbidity and mortality. The purpose of this study is to describe the efficacy and safety of continuous pentobarbital and midazolam infusions for the management of RSE at a children's hospital. **Methods:** A retrospective chart review was conducted to evaluate all patients treated with continuous infusion anesthetics between January 10, 2010 and December 31, 2015 for the management of RSE. Patients were included if they received continuous midazolam and/or pentobarbital infusions. The primary outcome was successful resolution of RSE following administration of these agents, defined as either discontinuation of continuous infusion anesthetics or discharge from the intensive care unit to a non-intensive care unit. Secondary outcomes were the intensity of hemodynamic intervention required and adverse effects. **Results:** All patients at Cincinnati Children's Hospital Medical Center (CCHMC) who received midazolam and/or pentobarbital infusions for the treatment of RSE were reviewed. Forty-seven patients, median age 4 years, were identified; 17% received midazolam monotherapy, 21.3% received pentobarbital monotherapy, and 61.7% received both midazolam and pentobarbital. Successful resolution of RSE was achieved in 87.2% of patients. Thirty-five patients required hemodynamic intervention with the use of vasopressors. Of those 35 patients, 57.1% required one vasopressor, 40% required two vasopressors, and 2.9% required three vasopressors. Other adverse effects identified included: respiratory depression requiring intubation (45), ileus (7), catheter-associated urinary tract infection (14), ventilator-associated pneumonia (18), acute kidney injury (2), and propylene glycol toxicity (3). **Conclusion:** The use of conventional continuous infusion anesthetics is highly efficacious for the treatment of refractory status epilepticus but results in hemodynamic instability and respiratory depression.

Learning Objectives:

Review the pathophysiology and pharmacological agents used for the treatment of refractory status epilepticus

Recognize adverse effects associated with continuous infusion anesthetics used for the treatment of refractory status epilepticus

Self Assessment Questions:

Benzodiazepines and barbiturates are used for the treatment of refractory status epilepticus. Which of the following statements about their mechanism of action is true?

- A They are GABA agonists and suppress the excitatory effects of GABA
- B: They are GABA agonists and enhanced the inhibitory effects of GABA
- C: They are NMDA receptor antagonists and suppress the excitatory effects of GABA
- D: They are NMDA receptor antagonists and enhance the inhibitory effects of GABA

Which of the following is an adverse effect associated with midazolam and pentobarbital?

- A Diarrhea
- B Hypertension
- C Respiratory depression
- D Seizures

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-676L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPROVING ADHERENCE TO SURVIVING SEPSIS CAMPAIGN GUIDELINE RECOMMENDATIONS FOR CRYSTALLOID BOLUS ADMINISTRATION PRIOR TO VASOPRESSOR USE IN THE EMERGENCY DEPARTMENT: A PHARMACIST QUALITY IMPROVEMENT PROJECT

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Purpose: Sepsis is a life threatening organ dysfunction caused by a dysregulated host response to infection. In 2000, nearly one out of every 23 patients in the hospital had septicemia. In 2013, sepsis accounted for \$23.7 billion in hospital costs, leading to the establishment of Core Measures by the Center for Medicare and Medicaid Services (CMS). CMS reimbursement will directly correlate with the compliance of the treatment bundles as recommended by the Surviving Sepsis Campaign, known as early goal-directed therapy. The purpose of this study is to examine the effect of pharmacist intervention on compliance to the administration of a 30 mL/kg crystalloid bolus prior to vasopressor use in patients with suspected sepsis. **Methods:** This pre and post-intervention comparison study collected data for adult patients discharged from the hospital who were: hypotensive (systolic blood pressure <100 mmHg), with a lactic acid ≥ 2 mmol/L drawn in the emergency department (ED), for compliance with the 30 mL/kg crystalloid bolus. Multi-disciplinary questionnaires identified educational and workflow barriers. A multi-disciplinary team evaluated the results and implemented the following interventions: a laminated pocketcard containing the fluid bolus/sepsis protocol along with definitions of sepsis and septic shock was distributed to the ED nursing staff, personalized one-on-one education was provided to ED physicians regarding customization of an electronic "ED Sepsis Orderset", and pharmacists received training on their role in the management of septic patients. Post-intervention data is currently being collected. **Results/Conclusions** Data analysis is pending and will be presented at the Great Lakes Pharmacy Resident Conference in April 2017.

Learning Objectives:

State the components of the Surviving Sepsis Campaign 3-hour bundle
Identify knowledge and workflow barriers that were identified for reasons of noncompliance by ED staff

Self Assessment Questions:

Septic patients at All Saints Hospital emergency department have often been started on vasopressors prior to completing which component of the 3-hour bundle as recommended by the Surviving Sepsis Campaign?

- A: Draw a lactate acid level
- B: Administer 30 mL/kg crystalloid fluid bolus for hypotensive patients
- C: Draw 2 blood cultures
- D: Administer broad spectrum antibiotics

The pharmacist has been incorporated into the management of septic patients at All Saints by?

- A: Evaluating "septic" patient for appropriate antibiotics and fluid resuscitation
- B: Placing orders using the "ED Sepsis Orderset"
- C: Completing medication histories on the patients
- D: Staying in central pharmacy out of the way

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-712L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DEVELOPMENT AND ASSESSMENT OF AN INTRANASAL ADMINISTRATION PROTOCOL FOR PARENTERAL MEDICATIONS IMPLEMENTED WITHIN A COMMUNITY HEALTH SYSTEM EMERGENCY DEPARTMENT SETTING

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Intranasal administration of medications offers a convenient, non-invasive method of systemic administration that is often underutilized despite its clinical advantages. Parenteral medications with suitable molecular characteristics mimic the pharmacokinetics of traditional routes of systemic administration, making it an alternative route uniquely suited for the emergency department and pre-hospital settings. A review of literature published between 2001 and 2016 in these clinical settings was utilized to create a dosing protocol standardizing use of the intranasal route. Four indications and corresponding agents were identified for inclusion in this emergency department protocol, including pain management (fentanyl, ketamine), pre-procedural/imaging anxiolysis (ketamine, midazolam), abortive seizure therapy (midazolam) and opioid overdose (naloxone). Prior to implementation, no formalized guidance existed regarding the use of parenteral medications administered via the intranasal route by nasal atomizer in the emergency department setting at this multi-site health system. Medication use policies and procedures were reviewed by emergency department and pediatric physician groups, approved by the health system Pharmacy and Therapeutics Committee in October 2016, and subsequently implemented in December 2016. Validated survey data was collected prior to and three months post-implementation from a cross-section of emergency department staff - including physicians, mid-level providers, pharmacists, and nurses - to evaluate changes in perception, acceptance, and clinical knowledge retention through provision of provider education and clinical resources. Survey data assessed included the nature of any prior exposure to use of the intranasal route; comfort level, familiarity, and knowledge of pharmacological effects, administration technique, and patient education; and perceived utility in adult and pediatric patient populations. In addition, a retrospective, post-implementation evaluation was completed to examine utilization patterns and outcomes of the intranasal administration dosing protocol. Individual reduction in visual analog pain scores (specific to pain management) and documented assessment of therapeutic benefit were evaluated to analyze clinical

Learning Objectives:

Define the elements incorporated into the design of an intranasal dosing protocol and pre-assessment of emergency department staff familiarity with the intranasal route of administration

Identify the aspects of pre-implementation healthcare provider education that effectively addressed baseline knowledge gaps regarding use of the intranasal route of administration in the emergency department setting

Self Assessment Questions:

Optimal parenteral agents for intranasal administration via nasal atomizer possess which of the following characteristics?

- A: Large particulate size
- B: Commercial availability of FDA-approved intranasal formulations
- C: Hydrophilicity
- D: Similar pharmacokinetics and bioavailability to the parenteral route

Which clinical element was not addressed by provider education resources or computerized physician order entry design?

- A: Proper technique for drawing dose volume into a mucosal atomizer
- B: Alternative mucosal membranes acceptable for administration
- C: Dose volume restrictions for optimal intranasal absorption
- D: Accurate dose rounding for concentrated medication formulations

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-523L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATING PHARMACIST INTERVENTIONS IN A PILOT PHARMACIST-MANAGED CHRONIC OBSTRUCTIVE PULMONARY DISEASE CLINIC

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Purpose: The Global Initiative for Chronic Obstructive Lung Disease guidelines state that chronic obstructive pulmonary disease (COPD) is a complex disease that requires well-organized care and the input of multiple healthcare providers. Numerous pharmacist-managed clinics have been successful in improving patient care; however, there is a lack of published data reflecting the design and benefit of pharmacist-managed COPD clinics. The primary objective of this project is to evaluate the impact of pharmacist involvement in the treatment of COPD by identifying the number and type of interventions made in a pilot pharmacist-managed COPD clinic. **Methods:** This quality improvement project includes patients that have been enrolled in a pilot pharmacist-managed COPD clinic at the Chalmers P. Wylie VA Ambulatory Care Center Community Based Outpatient Clinic in Newark, Ohio. Eligible patients are those with a diagnosis of COPD, currently prescribed one or more inhalers, and able to attend face-to-face appointments. Exclusion criteria include patients with a diagnosis of congestive heart failure class III or IV, have had a recent lung infection in the past 3 months, oxygen dependent, or require chronic use of steroids for the treatment of COPD. Completed progress notes were reviewed to assess frequencies and percentages of the total number of interventions and the specific types of interventions made by a pharmacist. In addition, the mean, standard deviation, and range of values for the total number of interventions and the specific type of interventions were examined. Types of interventions include the number of corrections in inhaler technique recommended by a pharmacist, recommendations made to primary care providers regarding COPD medications and/or immunizations, and referrals for pulmonary services and/or tobacco cessation. Results and conclusions will be presented at the Great Lakes Residency Conference

Learning Objectives:

Identify the need for pharmacist involvement in the management of COPD

Discuss the impact proper inhaler technique can have on patients with COPD

Self Assessment Questions:

In 2011, lower respiratory disease (including COPD) was the _____ leading cause of death in America.

- A: First
- B: Third
- C: Fourth
- D: Sixth

COPD has been described as 10% medication and 90% education. Proper inhaler technique and education regarding medications and symptoms of an exacerbation has been shown to

- A: Reduce ER visits and hospitalizations
- B: Increase health care costs
- C: Improve quality of life
- D: Both A and C

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-474L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

OXANDROLONE INDUCED HEPATIC TRANSAMINITIS IN SEVERELY BURNED PATIENTS: A RISK FACTOR ANALYSIS

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Purpose: Oxandrolone is an anabolic androgenic steroid that has been shown in the severely burned to increase body mass, promote wound and skin graft healing, and restore body weight. Although the benefits of oxandrolone have been proven, the risk factors of developing the most common adverse event, transaminitis, is still unknown. Therefore, the purpose of this study is to determine the risk factors for the development of oxandrolone induced transaminitis. **Methods:** This single-center, retrospective risk factor analysis will compare patients with a severe burn injury treated with oxandrolone therapy with and without the development of transaminitis. All patients admitted to The Ohio State University Wexner Medical Center, an American Burn Association verified adult comprehensive burn center, with an initial total body surface area (TBSA) thermal burn injury >10% who were treated with oxandrolone between the dates of December 1, 2011 and September 30, 2016 will be eligible for evaluation. Exclusion criteria are: age <18 years, pregnant, incarcerated, or received initial burn care with oxandrolone at an outside hospital. The primary outcome will be to determine the incidence of transaminitis and to identify risk factors associated with the development of transaminitis in the severely burned patient population treated with oxandrolone. The development of transaminitis will be defined as any aspartate aminotransferase (AST) or alanine aminotransferase (ALT) value >100 U/L. Secondary outcomes will include the percentage of AST/ALT elevation from baseline, hospital length of stay, and development of liver dysfunction. A univariable logistic regression model will be used to identify risk factors for hepatic transaminitis among burn patients receiving oxandrolone. **Results and conclusion:** Final data analysis of results is ongoing and will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify the percentage of severely burned patients that developed transaminitis while on oxandrolone therapy.

List the possible risk factors that can lead to the development of oxandrolone induced transaminitis in the severely burned patient population.

Self Assessment Questions:

Patient BR has been in the burn unit for the past month after experiencing a 45% TBSA thermal burn. The physician is concerned, at this week the patient has developed transaminitis with an AST of 165

- A: Oxandrolone
- B: Piperacillin/Tazobactam
- C: Fluconazole
- D: All the above

How long does it take for a patient to develop transaminitis while on oxandrolone therapy?

- A: 3 weeks
- B: Can occur at any time
- C: 1 week
- D: 1 month

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-484L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

CURRENT ANTIRETROVIRAL THERAPY PRESCRIBING PRACTICES IN HIV-INFECTED MEN VERSUS WOMEN WITH DRUG RESISTANCE MUTATIONS

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Purpose: Human immunodeficiency virus (HIV) treatment guidelines are based on evidence from clinical trials enrolling 80 percent men. Existing literature suggests that sex-based differences in antiretroviral efficacy may exist, but trials lack appropriate power to demonstrate a statistically significant difference. A local pilot study suggested that regimens containing two active drugs may be as efficacious as a three-drug regimen in women with the M184V mutation. The purpose of this study was to determine if gender differences impact the ability to attain viral suppression in patients with drug resistance mutations. **Methods:** A retrospective chart review was conducted on patients receiving treatment at the study center from January 1, 2003 to July 30, 2016. The focus was prescribing practices in HIV-infected men compared to women with major drug resistance mutations. Patients were excluded for lack of a genotype and inadequate documentation of viral load (VL) or CD4 counts prior to initiating or changing therapy. The most common drug resistance mutations were identified and regimens were evaluated for viral suppression success (VL less than 200 copies/mL). Male patients were matched with female patients based on age, length of HIV diagnosis, and baseline VL and CD4 counts. Data was analyzed using descriptive statistics, Chi-square tests, and logistic regression. **Results:** The most common mutation identified was M184V. Women with this mutation attained viral suppression more commonly with regimens containing two active drugs (60%) compared with three (55.6%). Men with this mutation attained virologic suppression more commonly with a three-drug regimen (61.5% vs. 58.5%). **Conclusions:** Data collection and analysis is ongoing, but preliminary results suggest that regimens containing two active drugs may be as efficacious as a three-drug regimen in women with the M184V mutation.

Learning Objectives:

Recognize a drug affected by the M184V mutation
List potential sex-based differences in HIV management

Self Assessment Questions:

In patients who express the M184V mutation, there is a high level of resistance to:

- A: Tenofovir
- B: Emtricitabine
- C: Dolutegravir
- D: Raltegravir

Which statement is correct regarding sex-based differences in patients with HIV?

- A: No potential sex-based differences have been identified in existing
- B: Some literature suggest differences in antiretroviral efficacy and pl
- C: HIV treatment guidelines are based on evidence from clinical trials
- D: Both B & C are correct statements.

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-717L02-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION OF ELECTRONIC MEDICAL RECORD ENHANCEMENTS TO DECREASE THE RISK OF DRUG-INDUCED QT PROLONGATION

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Purpose: There are numerous drugs that can cause QT interval prolongation, with a subset having a known risk of torsade de pointes (TdP), a potentially fatal arrhythmia. Currently, this community health system has drug-drug interaction alerts for medications that have additive QT prolongation effects. However, there are no alerts when a medication that prolongs the QT interval is ordered for patients with a history of congenital long QT syndrome (LQTS) or when one of the 37 medications with a known risk of TdP is ordered for patients with a history of prolonged QTc. The purpose of this project is to implement electronic medical record (EMR) enhancements to decrease the risk of drug-induced QT prolongation and TdP in patients with a history of prolonged QTc or congenital LQTS. **Methods:** This quality improvement project was exempt from review from the Institutional Review Board. A retrospective electronic chart review was conducted from January 1, 2016 and June 30, 2016 to determine the number of patients with a history of prolonged QTc who received one of 37 identified medications with a known risk of TdP and the number of patients with a documented diagnosis of congenital LQTS administered medications that should be avoided in this patient population. Descriptive statistics were used to evaluate data. A multidisciplinary taskforce was assembled to determine criteria for QTc EMR improvements, including QTc prolongation threshold and QTc history time frame. The following EMR enhancements will be implemented: display of QTc values during medication ordering and verification process for 37 drugs with a known risk of TdP, implementation of an alert when ordering and verifying these medications in patients with a history of a QTc greater than 500 msec. **Results and Conclusion:** A summary of results and conclusions will be presented at the 2017 Great Lakes Residency Conference.

Learning Objectives:

Identify medications with a known risk of torsade de pointes
Discuss potential benefits of QT prolongation EMR enhancements

Self Assessment Questions:

Which of the following are medications with a known risk of torsade de pointes?

- A: Ciprofloxacin, albuterol, trazodone
- B: Amiodarone, ketoconazole, sertraline
- C: Azithromycin, escitalopram, flecainide
- D: Sotalol, loperamide, paroxetine

Which of the following is a potential benefit(s) of QT prolongation EMR enhancements?

- A: Decrease prescribing of drugs with a known risk of TdP in patients
- B: Save time/clicks during order entry and verification
- C: Provide additional precautions for providers unfamiliar with drugs
- D: All of the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-957L05-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF CHRONIC PAIN MEDICATION USE BEFORE AND AFTER ACUPUNCTURE AT EDWARD HINES, JR. VA HOSPITAL

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Purpose: The use of opioids for the treatment of chronic pain is associated with dependence, tolerance, hyperalgesia, abuse, and risk of accidental overdose. Due to these concerns, the use of opioids should be considered one part of an integrated pain treatment plan that includes both pharmacologic and non-pharmacologic interventions. Incorporation of non-pharmacologic interventions may allow for chronic pain medication dose reductions and discontinuations, especially with opioid medications. Acupuncture is one non-pharmacologic intervention that comes from Traditional Chinese Medicine and is thought to produce an analgesic effect via recruitment of neurotransmitters and activation of endogenous inhibitory pain pathways. While studies have shown reductions in pain scores after acupuncture, there are no studies examining the effect of acupuncture analgesia on chronic pain medication use. The objective of this quality improvement project is to evaluate chronic pain medication use before and after acupuncture at Edward Hines, Jr. VA Hospital as well as assess health care provider interventions to facilitate reduction or discontinuation of chronic pain medications. This project will be performed in collaboration with the Physical Medicine and Rehabilitation (PM&R) service. **Methods:** This is an IRB-waived, retrospective chart review of patients receiving acupuncture at Edward Hines, Jr. VA Hospital. Data collection included patient demographics; opioid/non-opioid/adjuvant analgesic use three months before, during, and six months after acupuncture therapy; non-pharmacologic interventions for the treatment of chronic pain; dates of first and last acupuncture sessions; pain scores three months before, during, and six months after acupuncture therapy; medication compliance; appointment compliance; and health care provider interventions to reduce doses of pain medications. The primary outcomes evaluated were pain scores before and after acupuncture therapy and health care provider interventions to reduce doses of chronic pain medications. **Results/Conclusion:** Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe how acupuncture and opioid analgesics produce an analgesic effect

Identify various pharmacologic and non-pharmacologic interventions to reduce doses of opioid medications used in the treatment of chronic pain

Self Assessment Questions:

What is the mechanism by which opioid medications produce an analgesic effect?

- A: Inhibition of opioid receptors on neuronal cell membranes
- B: Activation of opioid receptors on neuronal cell membranes
- C: Inhibition of prostaglandin synthesis in the central nervous system
- D: Inhibition of cyclooxygenase-1 and cyclooxygenase-2 enzymes

Which of the following are interventions that can be used as part of an integrated chronic pain treatment plan?

- A: Cognitive Behavioral Therapy (CBT)
- B: Physical Therapy/Occupational Therapy (PT/OT)
- C: Complementary and Alternative Medicine (CAM)
- D: All of the above

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-915L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

COMPARISON BETWEEN PHYSICIAN AND PHARMACIST FACILITATED ORDERING OF HOME MEDICATIONS UPON HOSPITAL ADMISSION

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Purpose: Resuming appropriate and accurate home medications upon hospital admission is essential to ensure a smooth transition of care, optimize medication management, and prevent medication errors. The purpose of this project was to evaluate the accuracy and efficiency of physician ordering of home medications compared to a pharmacist facilitated ordering process upon hospital admission. **Methods:** The standard inpatient admission workflow was compared to a new workflow developed in the emergency department clinical decision unit (CDU) in which pharmacists pend appropriate home medications to be resumed or held following a completed medication history. Pharmacist pended medications are reviewed by the provider prior to release. This CDU workflow was designed to ensure medications are ordered after completion of a medication history to eliminate medication related problems (MRPs) encountered upon ordering from historical, prepopulated lists, which is common in the standard workflow. Comparative baseline data was collected on the inpatient hospitalist and cardiology units via pharmacist recording of number and type of MRPs identified during medication reconciliation of the admission orders against the completed medication history. The number of MRPs identified on admission to the inpatient units was then compared to physician acceptance of pharmacist pended orders in the CDU. Efficiency data was discretely collected for both workflows utilizing time stamps linked to pharmacist actions during the admission process.

Results: Results to contain data on accuracy of home medication ordering within the current admission workflow as well as acceptance of pharmacist pended orders. Average time to complete the admission process will also be presented for both workflows. **Conclusions:** To be presented at the Great Lakes Resident Conference.

Learning Objectives:

Describe the process for changing workflows that impact multiple disciplines

Identify which medication related problems are most common during physician ordering of home medications

Self Assessment Questions:

1. What is the best way to implement workflow changes involving multiple disciplines?

- A: Wait until the day of implementation to communicate workflow changes
- B: Propose workflow changes early on in the implementation process
- C: Utilize email communication to discuss workflow changes as email
- D: Obtain input from all disciplines whether or not changes affect the

What type of medication related problem was most common following physician ordering of home medications?

- A: Drug not ordered as missing on previous list
- B: Incorrect dose
- C: Incorrect frequency
- D: Medication ordered that patient is no longer taking

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-953L05-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF THE PRESCRIBING OF DIRECT ORAL ANTICOAGULANTS IN THE SETTING OF NEW ONSET VENOUS THROMBOEMBOLISM: INCREASING PROVIDER EDUCATION AND USE OF DIRECT ORAL ANTICOAGULANTS.

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Purpose: New onset venous thromboembolism (VTE) treatment initiated with warfarin for at least three months requires a significant amount of time and resources for both inpatient and outpatient management. Inpatient length of stay, bridging requirements, outpatient follow up appointments and lab draws all affect patient and provider satisfaction of management. A 2016 update to the CHEST guidelines suggests direct oral anticoagulants (DOACs) over warfarin for treatment of VTE for non-cancer patients based on similar efficacy, less bleeding, and greater convenience for patients and health care providers. Utilizing DOACs instead of warfarin may reduce burden on pharmacists and patients.

Methods: A retrospective chart review is being conducted to determine the percentage of non-cancer patients with new VTE who qualified for a DOAC that were treated with a DOAC (versus warfarin and low molecular weight heparin or heparin). The project will review all patients from January 2015 to October 2016 who were admitted to the emergency department, medicine floor, or evaluated in the outpatient clinic with a diagnosis of deep vein thrombosis and/or pulmonary embolism. A "DOAC friendly" decision tree was implemented for VTE treatment on the medical centers computerized order set to help guide providers in the appropriate choice of anticoagulant. Additionally, education was provided to prescribing providers and pharmacists on the clinical significance and logistics of the decision tree. Medication formulary prior authorization selection criteria were updated to reflect the medical centers preference for DOACs over warfarin for VTE. The primary outcome is to determine the percentage of appropriate DOAC prescribing for new onset VTE. Secondary outcomes include hospital length of stay, length of bridging requirements, number of outpatient lab draws/appointments with the pharmacist, and medication cost.

Results & Conclusion: Data collection and analysis is ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify patients who would qualify for a direct oral anticoagulant (DOAC) for treatment of venous thromboembolism (VTE).

Review unique counseling points for prescribing DOACs for VTE treatment.

Self Assessment Questions:

Which of the following patient diagnoses would qualify for a DOAC as first line therapy for VTE treatment?

- A: Active cancer
- B: CKD requiring dialysis
- C: CKD stage III with a creatinine clearance of 40 ml/min
- D: History of a prosthetic heart valve

Which of the following is correct about DOACs?

- A: Dabigatran can be placed in a pill box
- B: Dabigatran is not dialyzable
- C: In treatment of VTE, 5-10 days of LMWH is indicated before initiation
- D: Rivaroxaban should be dosed on an empty stomach to improve at

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-509L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

CLINICAL AND ECONOMIC OUTCOMES FROM A COMMUNITY HOSPITALS ANTIMICROBIAL STEWARDSHIP PROGRAM: PART II

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Background: Antimicrobial resistance, Clostridium difficile infection (CDI), and cost of infection are serious public health issues and a continuing concern for hospitals across the country. A study conducted previously at this institution that assessed the antimicrobial stewardship program (ASP) revealed implementation was associated with significant reductions in CDI rate, antimicrobial use, and pharmacy costs. Since then, our ASP has continued to evolve. The objective of this study is to evaluate the sustained success of our ASP. **Methods:** This study was approved by our organization's Institutional Review Board. All adult patients with an antimicrobial order admitted to our facility between January 2011 and December 2016 were included. Outcomes include the incidence of multi-drug resistant (MDR) infections, hospital length of stay, readmission, mortality, total antimicrobial costs, antimicrobial costs per patient-day, criteria restricted antimicrobial cost per patient day, and antimicrobial days of therapy per 1,000 patient days. Amortized reductions in CDI and MDR infection rates were utilized to calculate predicted avoidances using literature defined values for cost of infection length of stay, readmissions and mortality. **Results/Conclusion:** Preliminary results depict a 64% decrease in restricted antimicrobial usage from 2012 to 2015. The hospital onset CDI rate has fallen 6% since 2012. Using the amortized results from 2012 to 2015, the reduction in hospital onset CDI rate has led to a predicted 164 patient days avoided, 5.4 CDI related readmissions avoided, 2.4 patient related deaths avoided and \$311,971 in CDI related costs avoided. Research evaluating the impact of MDR infection rates is still ongoing.

Learning Objectives:

Recognize antimicrobial stewardship interventions a hospital can utilize to reduce the adverse effects associated with antimicrobials.

Identify quality measures that can be assessed to evaluate antimicrobial stewardship program interventions.

Self Assessment Questions:

Which of the following interventions can reduce the adverse effects associated with antimicrobials?

- A: Long term use of broad spectrum antimicrobials
- B: Utilizing fluoroquinolones for all patients with community acquired
- C: Narrowing antimicrobial therapy based on culture results
- D: Treating asymptomatic bacteriuria

Which of the following is an example of an Infectious Disease Society of America (IDSA) recommended clinical outcome measure that can be used to evaluate an antimicrobial stewardship program intervention?

- A: One year readmission rate
- B: Hospital acquired CDI rate
- C: ASP recommendation acceptance rate
- D: One year mortality rate

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-355L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF AMBULATORY CARE PHARMACY SERVICES IN A GERIATRICS SENIOR HEALTH CENTER

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Purpose: With a growing geriatric population, a focus on reduction of polypharmacy and avoidance of prescribing errors is vital to improve patient quality of life and to provide excellent patient care. Management of drug therapy in geriatric patients can be associated with unique challenges. As the pharmacotherapy experts, pharmacists are a vital member of the interdisciplinary medical team. Pharmacists can improve patient care by providing comprehensive medication reviews and education of patients and their caregivers. Pharmacists can add additional value by identifying drug therapy problems and intervening as part of the multi-disciplinary medical team. The primary objective of this research is to assess whether the integration of a clinical ambulatory care pharmacist into the geriatrics clinic multidisciplinary team adds value to the care provided to patients at the geriatric clinic through medication related education and interventions. Secondly, impact on clinic staff and operations will be assessed. **Methods:** A multimodal, outpatient, observation study at Indiana University Health Physicians Geriatrics Senior Health Center was conducted from January 1, 2017 to April 30, 2017 to identify the impact of ambulatory care pharmacy services on patient care and clinic staff satisfaction. Patients with scheduled clinic visits who underwent comprehensive medication review by a pharmacist during the pilot period will be included in this study. Data collected includes patient demographics, number of identified medication related problems, number of modifications to the medication list, length of education provided, and number of high risk medications for the elderly at the start and completion of patient appointment. **Results/Conclusion:** Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference

Learning Objectives:

Describe unique challenges in caring for geriatric patients.

Identify areas in which pharmacists can impact patient care in a geriatrics clinic.

Self Assessment Questions:

Which of the following is true regarding geriatric patients?

- A Changes in pharmacokinetic and pharmacodynamic properties occur
- B: The geriatric population has been steadily decreasing over the last decade
- C: Common therapies prescribed for chronic and acute conditions may differ
- D: Both A and C

Which of the following is an area in which pharmacists can impact patient care in geriatric patients?

- A Providing education to patients and caregivers
- B Identifying and suggesting alternatives for high risk medications in
- C Screening for adverse reactions to medications
- D All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-511L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPROVING PATIENT ACCESS TO PHARMACY SERVICES THROUGH COLLABORATION WITH THE CLINICAL CONTACT CENTER

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Purpose: Patient convenience and ability to access health care are top priorities for many health care systems. Health care systems are leveraging innovative technologies and centralizing services to meet these priorities while managing resources efficiently. With the advent of innovative technologies, face-to-face pharmacy services can be offered to patients remotely. An innovative structure was developed and piloted to provide telepharmacy services to patients within a health care system. **Methods:** To develop this innovative structure, telehealth services offered within the organization were identified. Pharmacy services that could be offered to patients using a telepharmacy model were inventoried and prioritized based on ease of implementation, value added to patients, and ability to improve workflow efficiency. An interdisciplinary team was developed to design, implement, and analyze the integration of a pharmacist into an existing clinical contact center. Data was collected to assess the initial services offered. This data was used to optimize workflows and expand services offered.

Results: Four telehealth services, including medication refill authorizations, medication question hotline, patient education, and medication history collection, were identified for pharmacists to provide in collaboration with clinical contact center caregivers. Four pharmacists were trained for first phase of the pilot, which was conducted over a 6-week period. Pharmacists provided these services from 5-9pm Monday through Friday. A total of 175 services were provided to patients with the average time to per patient encounter of 14 minutes. Limitations were identified, and a second phase of the pilot was conducted with expanded hours of operation, as well as an expansion of services, to increase service volumes. At the conclusion of the second phase, a total of 416 services were completed over 17 weeks with an average time per patient encounter of 19 minutes. **Conclusions:** An innovative structure for telepharmacy services for ambulatory patients was developed and implemented in collaboration with the Aurora Clinical Contact Center.

Learning Objectives:

List important considerations involved in developing a new pharmacy service structure.

Identify barriers leading to decreased pharmacy service volumes.

Self Assessment Questions:

Which of the following are important to consider when developing a new service structure?

- A Location where the services will be provided
- B: Equipment necessary to operate the services
- C: Staff necessary to provide the services
- D: All of the above

Which of the following is/are barriers to service volumes?

- A Utilizing an automated pharmacy consultation processes
- B Limited hours of operation
- C Lack of pharmacist to pharmacist communication
- D None of the above

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-909L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF PHARMACIST INVOLVEMENT IN DISCHARGE MEDICATION RECONCILIATION

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Purpose: The purpose of this retrospective review at Presence Saints Mary and Elizabeth Medical Center (PSMEMC) is to assess the impact of pharmacist intervention during the discharge medication reconciliation process on medication discrepancies from the medical inpatient units.

Methods: This retrospective patient chart review will examine the number and type of medication discrepancies between an intervention and a control group. Patients will be included if they are discharged from a medical inpatient unit (5th - 8th floor) by the Family Medicine Service or a private attending physician. Patients will be excluded if they leave against medical advice or are discharged to hospice care or another healthcare facility. The control group will include patients discharged from January through April 2015, prior to the implementation of pharmacist discharge medication reconciliation review. The intervention group will include patients discharged from January through April 2016 who had their medication reconciliation reviewed by a pharmacist at discharge. The intervention consists of four components: (1) discharge medication lists prepared by the physician within the electronic hospital record; (2) pharmacist review of the discharge medication list to identify potential errors and discrepancies; (3) discussion between the pharmacist and physician to correct prescriptions as needed; and (4) patient counseling with education about their discharge medication list. Data from 100 patients will be evaluated in both the intervention and control group, giving a total of 200 patients for the study. The control group will differ from the intervention group due to the lack of pharmacist involvement in preparing discharge prescriptions and fewer pharmacist discussions with the patients regarding their home medication list.

Results: Preliminary results from the control group have shown that therapeutic duplication and incorrect patient instructions have been the most common discrepancies during discharge medication reconciliation. The remaining findings will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify potential medication discrepancies occurring at discharge.

Describe pharmacist interventions during the discharge medication reconciliation process.

Self Assessment Questions:

From the following, what are the top two most common errors/discrepancies that occur during discharge at PSMEMC prior to pharmacist intervention?

- A: Therapeutic duplication
- B: Potential for severe drug allergies
- C: Incorrect patient instructions
- D: Both A and C

What are potential pharmacist interventions during discharge medication reconciliation?

- A: Provide a complete and accurate medication list for a patient
- B: Avoid excess costs for the hospital
- C: Provide patient safety
- D: All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-802L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

METHADONE VERSUS SCHEDULED IMMEDIATE RELEASE OPIOID THERAPY IN TIME TO DISCONTINUATION OF CONTINUOUS INFUSION ANALGESIA

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Critically ill patients routinely experience pain necessitating continuous infusion (CI) analgesics. Opioid tolerance results due to prolonged CI and alternative agents can facilitate discontinuation. Methadone possesses unique pharmacology as an opioid with N-methyl-D-aspartate receptor antagonism and a long duration of action. Methadone utility over immediate release opioids (IRO) in critically ill, mechanically ventilated patients for CI analgesia weaning is unknown. The primary study aim is to evaluate time to CI analgesia discontinuation for methadone versus scheduled IRO. Secondary aims include patient characteristics associated with methadone therapy response along with description of prolonged QTc interval and/or fatal arrhythmia incidence in patients receiving methadone in comparison to those receiving IRO.

This single center, retrospective, cohort study included adults admitted to the intensive care unit (ICU) on mechanical ventilation for ≥ 48 hours and received CI analgesia plus concomitant methadone or scheduled IRO. Exclusion criteria included scheduled IRO for ≥ 48 hours prior to initiation of methadone and simultaneous methadone with scheduled IRO. The primary outcome evaluated was time to CI analgesia discontinuation. Secondary outcomes included initial, 96-hour, and final methadone or IRO dose in oral morphine equivalents at CI analgesia discontinuation. Logistic regression analyses were performed to determine factors associated with and independent predictors of methadone response. Covariates with a resulting p value of < 0.2 were included in the regression analysis. Proportion of patients with QTc prolongation with and without fatal arrhythmias were captured and described. Final results and conclusions are pending and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss effects of withdrawal from continuous infusion analgesics

Describe pharmacologic characteristics of methadone

Self Assessment Questions:

Which of the following has been associated with withdrawal from continuous infusion analgesics?

- A: Decreased used of propofol
- B: Increased use of antipsychotics
- C: Increased mechanical ventilation days
- D: Longer hospital length of stay

Which of the following accurately describes methadone's pharmacokinetic profile?

- A: Widely distributed to tissue; with continuous use, tissue levels may
- B: Short half-life of 4-6 hours
- C: Reliable oral bioavailability of 100%
- D: Hydrophilic

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-820L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF THE EFFECT OF MAINTENANCE FLUIDS ON ELECTROLYTES AND ACUTE KIDNEY INJURY IN THE NEUROSURGICAL INTENSIVE CARE UNIT.

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Background: In the neurosurgical intensive care unit (NSICU) population, cerebral oxygenation for patients with traumatic brain injury is directly related to the blood brain barriers ability to maintain a balance between volume and pressure. Neuro Critical Care guidelines state that euvolemia is the preferred state for fluid balance in order to maintain appropriate oxygenation for the brain; which differs from critically ill septic patients whose fluid status is guided by hemodynamics. In critically ill patients, contradictory evidence has been published regarding intravenous fluid choice and its effect on electrolyte imbalances, as well as, acute kidney injury development. In neurosurgical patients, if the blood brain barrier is disrupted, hemostasis is altered, leading to increased risk for electrolyte imbalances. Previous studies have determined that isotonic fluids are preferred over colloids due to less likelihood of causing harm in patients with subarachnoid hemorrhages. In a study by Lehman et al, balanced salt solutions exhibited a positive effect on electrolytes; others have demonstrated a benefit of these fluids on intracranial pressure. **Objectives:** This study aims to identify whether the choice of maintenance intravenous fluids has an effect on electrolyte imbalances or the development of acute kidney injury in neurosurgical patients. **Methods:** This retrospective chart review will identify patients who received normal saline as a maintenance fluid from July 2015 to January 2016 and examine the effect on electrolytes. These results will be compared to patients who received balanced crystalloid solutions from January 2016 to July 2016 post-implementation of the new protocol. Our primary endpoint is the development of acute kidney injury or electrolyte imbalances, focusing on sodium, chloride and bicarbonate. The secondary endpoints will include the development of metabolic acidosis defined by an anion gap greater than 12. **Results:** Results and conclusions will be presented at Great Lakes.

Learning Objectives:

List the different maintenance fluid options for patients in the NSICU.
Review the important factors to consider when choosing maintenance fluids for critically ill brain injured patients.

Self Assessment Questions:

What factors must be taken into account when choosing maintenance fluids for critically ill brain injured patients?

- A Fluid Tonicity
- B: Cerebral Edema
- C: Volume/Pressure Characteristics
- D: All of the above

Which of the following solutions is least consistent with blood osmolality

- A Lactated Ringers
- B Normosol
- C Normal Saline
- D Plasma-lyte

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-859L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF A CARTFILL WORKFLOW REDESIGN

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Purpose: In order to expand pharmacy services in an inpatient pharmacy without increasing human resources, the central pharmacy needs to run as efficiently as possible. The filling process for a 24-hour daily cart exchange (cartfill) is generally the most labor-intensive medication distribution process for an inpatient pharmacy. A cartfill process that occurs during first shift, although appealing to staff, is inefficient because it occurs while providers are making therapy changes, and patients are being discharged. The purpose of this study is to examine the impact on volume of returned medications when the timing of a 24-hour cartfill is changed from a first shift fill to a second shift fill. **Methods:** Baseline data were collected over a 2-week period in late October-early November 2016. During this baseline data collection, the 24-hour cartfill began at 0830 and ran for six hours. Data collected included the daily patient census, the number of patients discharged during or shortly after cartfill, and the number of medications that were returned to pharmacy during the cart exchange process. All data were normalized using hospital census. In mid-January 2017, the cartfill time was changed to start at 1700 and is expected to run for five hours. Post-intervention data will be collected in late January/early February 2017 after a one-week washout period to allow the new process to become established. Percent change in volume of returned medications will be used to evaluate intervention effectiveness. **Preliminary Results:** Baseline data show that an average of 1,291 individual medication doses were returned to the pharmacy on a daily basis pre-implementation. Post-implementation data are pending. **Conclusions:** Conclusions to be determined by final results.

Learning Objectives:

Identify potential reasons for inefficiency within a 24-hour cartfill process
Describe the impact of a first shift cartfill versus a second shift cartfill on central pharmacy workflow.

Self Assessment Questions:

Which of the following are potential causes of inefficiency for a 24-hour cartfill process?

- A Robot technology
- B: Patient discharges
- C: Computerized prescriber-order entry
- D: Automated dispensing cabinets

Which of the following is a disadvantage to switching from a first shift cartfill to a second shift cartfill?

- A Most patients have already been discharged for the day
- B Most providers have already entered therapy changes for the day
- C Technician staff may be dissatisfied with scheduling changes
- D First doses have faster turn-around time during peak daytime hour

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-837L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

A COMPARISON OF SMOKING CESSATION OUTCOMES BETWEEN THE COOPER-CLAYTON METHOD TO STOP SMOKING AND FREEDOM FROM SMOKING IN A COMMUNITY CLINIC SETTING.

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Purpose: Kentucky ranks first in the United States for tobacco use according to the CDC, justifying a great need for smoking cessation programs in the state. This study aims to compare the cessation rates between The Cooper-Clayton Method to Stop Smoking and the Freedom from Smoking programs in a pharmacist-run community clinic in Kentucky. While there is literature available on the programs individually, a study directly comparing the two has not previously been conducted. **Methods:** This study will be conducted at The Center for Health and Wellness (CHW), a pharmacist-run clinic located at Sullivan University College of Pharmacy in Louisville, KY. This study has received approval from the Sullivan University IRB. The CHW previously offered The Cooper-Clayton Method to Stop Smoking program, a 13-week program, but switched this year to offering Freedom from Smoking, a 7-week program. The programs will be compared based on 12-week cessation rates, which will be stratified according to the Fagerstrom Nicotine Dependence Test, a validated nicotine dependence test. Non-pregnant participants 18 years of age or older who enrolled in the clinics smoking cessation programs will be included. Data from Cooper-Clayton will be obtained retrospectively and data from Freedom from Smoking will be obtained prospectively over 2 years. The data will be collected via paper and phone surveys. **Preliminary Results:** The cessation rate from the 32 participants enrolled in The Cooper-Clayton Method to Stop Smoking program in 2015 was 43.8%. To date, there are 7 participants in the Freedom from Smoking program with a cessation rate of 42.9%. In addition to those who maintained complete cessation at 12 weeks, 42.9% reported decreased usage.

Conclusions: Based on the preliminary results, non-inferiority is expected to be shown between The Cooper-Clayton Method to Stop Smoking and the Freedom from Smoking programs 12-week cessation rates.

Learning Objectives:

Describe the main differences between The Cooper-Clayton Method to Stop Smoking and the Freedom from Smoking programs.

Recognize the appropriate nicotine patch starting dose given a patients tobacco usage.

Self Assessment Questions:

What is a major difference between The Cooper-Clayton Method to Stop Smoking program and the Freedom from Smoking program?

- A The Cooper-Clayton Method to Stop Smoking is a 7 week program
- B: Freedom from Smoking is a 7 week program with the quit day during
- C: The Cooper-Clayton Method to Stop Smoking is a 12 week program
- D: Freedom from Smoking is a 12 week program with the quit day during

A 56 YO WF in your smoking cessation class is interested in using nicotine patches to help her quit smoking. The patient has a PMH of hypertension that is controlled on medication. She reports that

- A 21 mg
- B 14 mg
- C 7 mg
- D The patient does not qualify for nicotine replacement therapy.

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-461L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

THE CLINICAL AND ECONOMIC IMPACT OF EXTENDED VERSUS INTERMITTENT-INFUSION PIPERACILLIN-TAZOBACTAM FOR SELECTED GRAM-NEGATIVE INFECTIONS AT A COMMUNITY MEDICAL CENTER

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Purpose: Antimicrobial stewardship strategies improve patient outcomes, decrease health care costs, and decrease microbial resistance rates. Extended-infusion dosing of time-dependent antibiotics is an antimicrobial stewardship strategy that provides enhancements in the pharmacokinetics of antibiotics and direct cost savings for institutions. Retrospective cohort studies comparing intermittent-infusion versus extended-infusion piperacillin-tazobactam in various populations have shown mixed results regarding clinical outcomes. The objective of this study is to compare clinical outcomes, economic data, safety, resistance patterns, and intravenous line accessibility between intermittent-infusion and extended-infusion piperacillin-tazobactam in patients with selected gram-negative infections. **Methods:** A retrospective chart review was conducted by obtaining hospital billing records and microbiology reports to identify patients with *Escherichia coli*, *Enterobacter* spp., *Klebsiella* spp., *Proteus* spp., *Pseudomonas aeruginosa*, *Serratia* spp., and *Citrobacter* spp. infections who received piperacillin-tazobactam for at least 48 hours. Patients over the age of 18 that received piperacillin-tazobactam before August 1, 2012 were placed in the intermittent-infusion group and patients receiving the drug after September 1, 2012 were placed in the extended-infusion group. Patients that were pregnant, discharged to hospice care, DNR-CCO status, or had organisms that were intermediate or resistant to piperacillin-tazobactam were excluded from the study. The primary outcome studied was the difference in mortality (in-hospital) between the intermittent-infusion and extended-infusion groups. Secondary outcomes that were compared in these groups include length of stay, length of piperacillin-tazobactam therapy, number of peripheral and central lines inserted after initiation of piperacillin-tazobactam, incidence of *Clostridium difficile* infection, and incidence of acute kidney injury. Additionally, cost of drug acquisition per admission and susceptibility patterns of selected gram negative infections over the study period were analyzed as secondary outcomes. Confounding variables assessed include intensive care unit stay, source of infection, renal impairment, body mass index, and concomitant aminoglycoside or fluoroquinolone use. **Results and Conclusions:** Data-analysis in progress, results to be presented.

Learning Objectives:

Recognize advantages and disadvantages of utilizing an extended-infusion dosing strategy for time-dependent antibiotics

Describe how confounding variables could affect the results of this study

Self Assessment Questions:

Which of the following is a disadvantage of utilizing extended-infusion in comparison to intermittent-infusion?

- A In patients receiving multiple intravenous therapies, additional intravenous
- B: The concentration of the drug exceeds bacterial minimum inhibitor
- C: An extended-infusion dosing strategy directly saves cost on drug acquisition
- D: The dose in an extended-infusion does not have to be increased compared

Which of the following scenarios regarding confounding variables would you expect to affect the results of the study?

- A A patient with a creatinine clearance of 60 mL/min.
- B A patient with a BMI of 24 m2.
- C A patient receiving a concomitant fluoroquinolone with piperacillin-
- D A patient discharged from a general floor that did not stay in the ICU

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-382L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

TIME TO TREATMENT START OF HEPATITIS C THERAPY WHEN MANAGED BY CLEVELAND CLINIC SPECIALTY PHARMACY

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Background: The treatment for hepatitis C virus (HCV) has considerably evolved since the introduction of HCV protease inhibitor therapies in 2011, with success rates surpassing 95%. However, dramatic time lapses are known to occur between diagnosis and starting anti-HCV therapy for various reasons. Once anti-HCV therapy is prescribed, completion of pre-treatment paperwork, insurance coverage, and medical eligibility need to be assessed as a patient is referred to a specialty pharmacy. If any elements are missing, time to treatment start is delayed. These times may vary, ranging from several days to a few months. Turnaround time for prescriptions is one of the five mandatory measures assessed by the Utilization Review Accreditation Commission (URAC) and is becoming increasingly important to improve the quality of patient care, avoiding further costs in the future. **Objective:** The purpose of this study is to evaluate the time to treatment start of anti-HCV therapy at Cleveland Clinic Specialty Pharmacy. **Methodology:** This retrospective cohort included over 300 adult patients who received a prescription for HCV treatment between August 2015 and July 2016 and had detectable HCV RNA at the time of study start. Time from receipt of prescription through the electronic medical record to time of prior authorization approval was determined. Secondary objectives included assessing medication adherence, SVR12 rates, and differences in time to treatment start based on insurance carrier and therapy prescribed. If the prior authorization is denied, the time from denial to appeal approval was also assessed. Baseline characteristics and primary and secondary endpoints will be analyzed using descriptive statistics. **Results and Conclusions:** To be presented at Great Lakes Pharmacy Resident Conference

Learning Objectives:

Review five mandatory measures assessed by the Utilization Review Accreditation Commission.

Identify factors that contribute to dramatic time lapses for prior authorization approval.

Self Assessment Questions:

Which of the following is one of the five mandatory measures assessed by the Utilization Review Accreditation Commission?

- A: Turnaround time for prescriptions
- B: Proportion of days covered
- C: Medication non-adherence
- D: Medications delivered on time

Which information does insurance require for anti-HCV therapy prior authorization approval?

- A: Svr12
- B: Gender
- C: Hcv ma
- D: Child-Pugh Score

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-785L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF MRSA PCR AS A DE-ESCALATION TOOL FOR HOSPITAL-ACQUIRED AND VENTILATOR-ASSOCIATED PNEUMONIA

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Introduction: Methicillin-resistant *Staphylococcus aureus* (MRSA) surveillance techniques have existed in hospitals primarily for the purpose of identifying patients with MRSA colonization and to rapidly contain the bacteria to just the infected patient. Recently, there is some clinical data that the surveillance techniques could be used in order to guide empiric drug therapy against MRSA pulmonary infection. With quicker identification of MRSA versus no MRSA, health care providers will be able to make more informed decisions about antibiotic therapy for their patients. The primary objective of this study is to determine the impact a MRSA PCR assay has on early de-escalation of vancomycin and other MRSA targeted therapies. **Methods:** Data for this retrospective study will be collected from the patients medical record. Adult patients will be included if they were admitted to the surgical ICU for a suspected hospital-acquired pneumonia or ventilator-associated pneumonia at University Hospital. Included patients will have a bronchoalveolar lavage (BAL), mini-BAL, or other respiratory culture drawn and have received at least one dose of antibiotic targeted against MRSA. Following identification of these patients, they will be separated into two groups, the patients that were administered the MRSA PCR assay and the patients that did not. Impact in this evaluation will be evaluated based on a difference between the two groups in MRSA targeted antibiotic duration, mortality, days free of mechanical ventilation, development of *Clostridium difficile*, and incidence of acute kidney injury. Results and conclusions of the project are currently being analyzed and will be presented during the conference.

Learning Objectives:

Discuss the possible treatment options for empiric coverage of MRSA in VAP.

Review the validity of the MRSA-PCR assay and its negative predictive value.

Self Assessment Questions:

Which of the following is recommended by the 2016 Clinical Practice Guidelines for the Management of Adults With Hospital-acquired and Ventilator-associated Pneumonia as empiric therapy to target MRSA

- A: Daptomycin 6mg/kg IV daily
- B: Linezolid 600mg IV Q12H
- C: Sulfamethoxazole and Trimethoprim 20mg/kg/day divided Q12H
- D: Tigecycline 50mg IV Q12H

Which of the following statements is correct based on what the literature demonstrates for the MRSA-PCR assay?

- A: Good positive predictor and good negative predictor for clinically significant MRSA
- B: Good positive predictor and poor negative predictor for clinically significant MRSA
- C: Poor positive predictor and poor negative predictor for clinically significant MRSA
- D: Poor positive predictor and good negative predictor for clinically significant MRSA

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-605L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EFFICACY OF PREOPERATIVE GABAPENTINOIDS AS ADJUVANT THERAPY IN MULTI-MODAL PAIN CONTROL FOLLOWING TOTAL KNEE ARTHROPLASTY

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Purpose: Total knee arthroplasty (TKA) is one of the most common elective surgical procedures in the United States. Some benefits of postoperative pain control include decreased length of hospitalization, fewer cardiopulmonary complications, and prevention of chronic pain development. The objective is to assess postoperative opioid use, pain scores, and hospital length-of-stay in TKA patients before and after implementing pre-procedural gabapentinoid use for adjunctive analgesia. **Methods:** This study was submitted to the Institutional Review Board. Data gathering occurred within the electronic medical record. The following data were collected: patients age, gender, body mass index, prior-to-admission opioid and gabapentinoid use, creatinine total opioid use during the first 24 hours after surgery, pain score 24 hours after surgery, length of hospitalization, and dose and type of gabapentinoid used preoperatively. Patients were matched according to baseline characteristics. Collected data was evaluated based on the average pain score at 24 hours postoperatively using the 10-point numeric rating scale, average opioid use in oral morphine equivalents for 24 hours postoperatively, and average length-of-stay. **Results:** Data were collected on 274 patients. The average age was 66.3 years and 65% of the patients were female. The average resting pain score was 4.25 and 4.58 in the pre-intervention group and post-intervention group, respectively (7.8% increase, $p = 0.25$). The total oral morphine equivalent use was 156.7 mg and 128.7 mg in the pre-intervention group and post-intervention group, respectively (18% decrease, $p = 0.003$). The length-of-stay was 2.78 days and 2.98 days in the pre-intervention group and post-intervention group, respectively (7.2% increase, $p = 0.035$). **Conclusions:** The administration of a single preoperative dose of a gabapentinoid resulted in a statistically significant decrease in the total opioid use during the first 24 hours postoperatively and a statistically significant increase in length-of-stay. The increase in length-of-stay has no projected clinical impact.

Learning Objectives:

Define the benefits of multi-modal pain control in TKA

Recognize the role of gabapentinoids in multi-modal pain control

Self Assessment Questions:

In what way has multi-modal pain control improved patient outcomes post-TKA?

- A: Decreased length of stay
- B: Decreased mortality
- C: Decreased opioid use
- D: Improved patient satisfaction

Which mechanism is responsible for the analgesic effects of gabapentinoids?

- A: Mu receptor antagonists
- B: Cyclooxygenase inhibitors
- C: Inhibition of prostaglandin synthesis
- D: Modulation of calcium release

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-365L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF AN EMERGENCY MEDICINE PHARMACIST ON APPROPRIATE EMPIRIC ANTIBIOTIC PRESCRIBING

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Purpose: Antimicrobial resistance has become a serious threat to public health throughout the world. More than 100 million patients are treated annually in emergency departments (EDs) throughout the U.S with an estimated 16% of patients receiving antibiotics. Due to the high volume of ED antimicrobial prescribing it is critical to engage ED providers in antimicrobial stewardship programs (ASPs). Emergency medicine pharmacists (EMPs) play an important role in ASPs by working with providers to choose the most appropriate antimicrobial therapy, dose, and duration. This study aimed to determine the impact of EMPs on the appropriateness of empiric antibiotic prescribing for community-acquired pneumonia (CAP) and community-acquired intra-abdominal infections (CA-IAI) over time. **Methods:** This Institutional Review Board-approved retrospective cohort study was conducted using the Mercy Health Saint Mary's (MHSM) electronic medical records database. The primary outcome of this study was to compare the appropriateness of empiric antibiotic prescribing when an EMP was present versus absent for patients diagnosed with CAP and CA-IAI. We additionally chose to compare the effect of EMP impact over time, examining an early ASP (March - September 2014) vs. versus established ASP (March - September 2016). Appropriate antibiotics were defined using local susceptibility patterns and national guidelines. Secondary outcomes included length of stay, in-hospital mortality, and hospital-acquired *Clostridium difficile* infections. Patients were excluded if they were less than 18 years old, had a discharge diagnosis of healthcare-associated pneumonia, ventilator-associated pneumonia, or

healthcare/surgical-associated intra-abdominal infection, or had an intestinal perforation of any type. Data measured on a nominal scale

were compared using the Chi-square test while data measured on a continuous scale were compared using a student's t-test or Mann-Whitney U test as appropriate. Multivariate logistic regression was used to assess for independent risk factors for treatment appropriateness. **Results & Conclusion:** To be presented at the Great Lakes Pharmacy Resident Conference

Learning Objectives:

Identify appropriate empiric treatment options for community-acquired intra-abdominal infections as defined by local susceptibility patterns in conjunction with national guidelines.

Discuss the impact an emergency medicine pharmacist has on antibiotic prescribing in the emergency department.

Self Assessment Questions:

Which of the following is the most appropriate empiric treatment option for community acquired diverticulitis?

- A: Piperacillin/tazobactam
- B: Ceftriaxone and metronidazole
- C: Ertapenem
- D: Ampicillin/sulbactam

Which of the following describes the impact EMPs have on antibiotic prescribing in the emergency department?

- A: Antibiotic doses were less appropriate
- B: Increased cost of antimicrobial therapy
- C: Improved use of guideline concordant antimicrobial prescribing
- D: Time to appropriate antibiotics was increased

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-396L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF CAREGIVER MEDICATION COUNSELING ON UNPLANNED 30-DAY READMISSIONS AND RECURRENT ED VISITS BASED ON SELECTED COGNITIVE AND BEHAVIORAL NURSING ASSESSMENT CRITERIA

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Purpose: Studies have concluded the important role a caregiver plays in medication adherence. The long-term effect on medication adherence and health literacy with caregiver education is unclear, especially those suffering from cognitive issues. Currently, Cleveland Clinic Akron General performs a daily nursing assessment on each patient for cognition and behavior as part of the standard of care. There is opportunity to put a systematic process in place that routinely identifies high-risk patients based on this nursing assessment who may require further assistance beyond direct patient education provided by a pharmacist or nurse at discharge. The primary objective of the study is to determine the impact of medication counseling involving a caregiver for patients identified through selected behavioral and cognitive nursing assessment criteria on composite unplanned 30-day readmissions and emergency department (ED) visits. **Methods:** A prospective, quasi-experimental study will be performed at Cleveland Clinic Akron General from November 1, 2016 to February 28, 2017. Patients who are 65 years or older, have at least six scheduled medications at discharge, and have a documented caregiver in the medical record will be included. Patients who meet the selected nursing assessment criteria at any point in their admission will have their caregiver educated about their medications either at discharge or as a follow-up phone call within 5 days of discharge. The primary outcome will be the composite number of 30-day unplanned readmissions and ED visits. This outcome will be compared between the prospective cohort of patients who had their caregivers counseled versus a retrospective cohort of patients who met the same inclusion criteria using the Fishers exact or Chi squared test, as appropriate. **Results/Conclusion:** Data collection and analysis is currently in progress and will be presented at the conference.

Learning Objectives:

Identify the most extensively studied disease state found to have both a high prevalence of cognitive impairment and hospital readmissions. Describe the various pharmacist-related methods to reduce readmissions and emergency department visits during a patients transition to home.

Self Assessment Questions:

Which of the following disease states was extensively studied to have both a high prevalence of cognitive impairment and hospital readmissions?

- A: Chronic obstructive pulmonary disease
- B: Pneumonia
- C: Congestive heart failure
- D: Myocardial infarction

Which of the following is a pharmacist-related method that is most likely to significantly reduce readmissions and emergency department visits during a patients transition to home?

- A: A pharmacist providing additional education at discharge and by a
- B: A pharmacist performing a partial review of a patient's medications
- C: A pharmacist identifying and intervening on patients who have a h
- D: A pharmacist providing only verbal education of medications to pa

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-810L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

CORTICOSTEROID DOSING AND PEMETREXED RASH INCIDENCE: A SINGLE-CENTER RETROSPECTIVE EVALUATION

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Purpose: Pemetrexed is an antifolate chemotherapy agent indicated for the treatment of nonsquamous non-small cell lung cancer and mesothelioma. Possible adverse effects include, but are not limited to, skin toxicity and myelosuppression. Supplemental folic acid and cyanocobalamin are recommended to reduce the incidence of myelosuppression. Skin toxicity with pemetrexed use has a reported incidence of 14%. Dexamethasone is recommended for prevention of pemetrexed-induced rashes. The current dosing recommendation is oral dexamethasone 4 mg twice daily the day before, day of, and day after pemetrexed administration (24 mg total). Subsequent studies have evaluated reduced-dose corticosteroid regimens and found a similar incidence of skin toxicity. The primary purpose of this study is to evaluate the effect of different corticosteroid regimens (less than 24 mg dexamethasone equivalents versus greater than or equal to 24 mg dexamethasone equivalents) on the incidence of pemetrexed-associated skin toxicity. Secondary outcomes include incidence of skin toxicity with specific oral and intravenous corticosteroid regimens as well as compliance with other supportive care medications. **Methods:** This retrospective study includes patients 18 years of age and older who received pemetrexed from May 1, 2012 to September 1, 2016. Pregnant patients, prisoners, or those with a non-standard pemetrexed-containing regimen were excluded. The following key information on each subject was recorded: patient demographics, supplemental folic acid and/or cyanocobalamin, body surface area, type of cancer, goal of treatment, chemotherapy regimen, steroid regimen (including medication, dose, route and frequency) with each cycle, and presence or absence of skin toxicity. If skin toxicity was present, the following additional information was collected: characteristics, associated delays in therapy, and symptomatic treatment provided. Nominal data will be analyzed using Chi-square or Fishers exact. Demographics and secondary endpoints will be analyzed using descriptive statistics. Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the key supportive care medications and dosing schedules for patients receiving pemetrexed.

Describe the incidence and type of cutaneous reaction most commonly associated with pemetrexed use.

Self Assessment Questions:

Which of the following are recommended supportive care medications used with pemetrexed?

- A: Dexamethasone, Fosaprepitant, Cyanocobalamin
- B: Dexamethasone, Folic Acid, Cyanocobalamin
- C: Dextrose, Folic Acid, Cyanocobalamin
- D: Dexamethasone, Folic Acid, Riboflavin

Which type of skin toxicity has the highest incidence in patients on pemetrexed?

- A: Alopecia
- B: Pruritus
- C: Rash
- D: Erythema

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-531L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATING THE NEED FOR HOME INFUSION SERVICES IN A LARGE ACADEMIC MEDICAL CENTER

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The shift to value-based reimbursement is forcing pharmacy departments to evaluate their medication management and ambulatory pharmacy services. Primary areas of interest include meds-2-beds, mail order, specialty and home infusion. The purpose of this research is to investigate the need and feasibility of creating home infusion services in a large academic medical center. Published literature supports home infusion services to be safe and clinically effective, and the cost of delivering care is significantly lower compared to that of the hospital or outpatient clinic. The University of Chicago Medicine (UCM) does not currently have a home infusion pharmacy and referrals are being outsourced to external pharmacies. The opportunity to establish a home infusion pharmacy and service our patients in the home has been amplified with the recent signing of the 21st Century Cures Act. Under this legislation, Medicare Part B drugs furnished through durable medical equipment (DME) will now be reimbursed at Average Sales Price (ASP) +6% decreasing provider reimbursements for these therapies. The impact of this legislation has been reflected in external pharmacies opting out to provide home infusion services to certain patient populations leading to a potential delay in discharge or interruption in therapy. This study will be submitted to the University of Chicago Investigational Review Board for review. A report will be generated with patient referrals to home infusion pharmacies placed by case managers from January 1, 2016 to November 31, 2016 using the web-based referral system. Data collection will also include patient name, insurance, prescriber, medication name, medication duration, referral date, provider, number of referrals placed and patient zip code. Protected health information will be de-identified for data record keeping

Learning Objectives:

Discuss the restructuring of the ambulatory infusion market away from the health system

Identify barriers to successful implementation of a home infusion pharmacy

Self Assessment Questions:

Which legislation changed the reimbursement methodology for Part B infusible drugs furnished through DME to ASP +6%?

- A: Medicare Modernization Act
- B: 21st Century Cures Act
- C: Medicare Home Infusion Site of Care Act of 2015
- D: Social Security Act

Which of these agents requires DME and would be reimbursed under Medicare Part B?

- A: Oral ondansetron
- B: Intravenous milrinone
- C: Oral methotrexate
- D: Intradermal influenza vaccine

Q1 Answer: B Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-900L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTING THE EDUCATION AND DRUG INFORMATION FRAMEWORK OF AN ANTIMICROBIAL STEWARDSHIP PROGRAM AT A FOUR-HOSPITAL COMMUNITY HEALTH SYSTEM

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Purpose: Antibiotic resistant infections are associated with a higher cost of care as well as a significantly increased risk of mortality for patients. The root cause of this problem is the inappropriate use of antimicrobial agents, especially in urban areas. The implementation of an antimicrobial stewardship program (ASP) is crucial in driving appropriate use of antimicrobial agents in the healthcare setting to reduce the burden of antibiotic resistant bacteria. The Joint Commission (TJC) has mandated all acute care hospitals have an ASP to help improve patient outcomes while minimizing unintended consequences of antimicrobial use, such as resistance. These new standards in combination with recent literature reviews have made the implementation of an ASP vital to improving patient outcomes and reducing antibiotic overuse. Each ASP will be evaluated on several core elements: leadership, accountability, drug expertise, action, tracking, education, and reporting. This project specifically aims to build the foundation for the drug information and education elements of the ASP to meet TJC standards. **Methods:** A taskforce of selected pharmacists and physicians determined the project objectives and assisted in decision making. Antimicrobial stewardship information was included on the discharge summaries for all patients discharged from the hospital with an antimicrobial prescription. The discharge information will be utilized to provide education to patients and families. An internal webpage dedicated to the ASP was created to house guidelines, policies, and program information in one central location. These core elements will continue to evolve and be refined to further optimize antibiotic stewardship. This project is a quality improvement project and is therefore exempt from review by the Institutional Review Board. **Results and conclusions:** Analysis of the adherence to standards is currently in progress. Final conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify two reasons for the implementation of an antimicrobial stewardship program.

Describe the methods that can be used to improve the drug information and education core elements to meet TJC expectations.

Self Assessment Questions:

Which of the following are reasons for implementing an ASP?

- A: Promote broad spectrum antimicrobial use and combination treatment
- B: Perform clinical and economic outcome analyses based solely on
- C: Attenuate antimicrobial resistance and reduce the cost of inappropriate use
- D: Participating only in direct patient care and leaving public health education to others

Which of the following methods may be used to improve adherence to TJC standards regarding the education element of an ASP?

- A: Appointing a single pharmacist leader responsible for working to improve
- B: Regularly reporting information on the ASP, such as information on
- C: Provide discharge information to hospitalized patients when being
- D: Monitoring the ASP, which may include information on antibiotic use

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-851L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EFFICACY OF CAPPED RASBURICASE DOSING FOR MANAGEMENT OF TUMOR LYSIS SYNDROME IN ONCOLOGY PATIENTS AT A PEDIATRIC INSTITUTION

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Purpose: Rasburicase is a recombinant urate-oxidase inhibitor indicated for management of hyperuricemia associated with tumor lysis syndrome (TLS). A single fixed dose of rasburicase has been shown to effectively normalize uric acid levels in adults. Due to the high cost of rasburicase and literature supporting a capped dose, Cincinnati Children's Hospital Medical Center (CCHMC) has defined an institutional guideline for rasburicase which recommends a capped dose of 7.5mg, except in renal dysfunction or serum uric acid > 10mcg/dL, and rounding down to vial size for doses less than 7.5mg. This study will determine the efficacy of this dosing guideline. **Methods:** The retrospective chart review was approved by the CCHMC Institutional Review Board and evaluates oncology patients who received rasburicase between December 1, 2014 and September 1, 2016. The primary objective of the study is to evaluate the efficacy of capped and rounded rasburicase doses in normalizing uric acid levels. **Results:** Fifty-seven doses were administered across thirty-two patients during the study period. The median age was 10.4 years (range 1-26 years). Twenty-one doses were capped per the guideline at 7.5mg and five doses exceeded the cap, only two of which met the defined exception criteria. The median time to uric acid nadir was 11.6 hours for capped doses and 12.4 hours for doses exceeding 7.5mg. Thirty-one weight-based doses were less than 7.5mg and therefore not eligible for dose capping. Only 13 (41.9%) of these doses were rounded down appropriately. Twelve patients required repeat rasburicase dosing, with a median time to repeat dose of 46.7 hours. Implementation of this rasburicase dosing guideline resulted in a cost savings of \$111,799.91 across the study period. **Conclusions:** Capped doses of rasburicase yield similar time to uric acid nadir compared to doses that exceed the cap. Capped and rounded doses provide significant cost-savings.

Learning Objectives:

Identify role of rasburicase in management of tumor lysis syndrome (TLS)
Discuss efficacy of capped and rounded down rasburicase dosing practice

Self Assessment Questions:

What pharmacological therapy can be utilized for the management of tumor lysis syndrome (TLS)?

- A: Allopurinol
- B: Rasburicase
- C: Intravenous fluids
- D: All of the above

How does rasburicase reduce hyperuricemia associated with tumor lysis syndrome (TLS)?

- A: Induce purine catabolism, reducing production of uric acid
- B: Inhibits xanthine oxidase, preventing conversion of hypoxanthine to uric acid
- C: Catalyzes uric oxidase for conversion of insoluble uric acid to soluble urate
- D: Dissolves uric acid via inhibition of xanthine oxidation

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-698L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

AN ANALYSIS OF PEDIATRIC PATIENT CONTROLLED ANALGESIA DOCUMENTATION COMPARING THE ELECTRONIC HEALTH RECORD TO ACTUAL USE DATA FROM THE PUMP SOFTWARE APPLICATION

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Purpose: Patient controlled analgesia (PCA) is a method of allowing patients to self-administer intravenous opioids, most commonly hydromorphone, morphine or fentanyl, to control their pain. The Institute for Safe Medication Practices (ISMP) classifies intravenous opioids as high alert medications. Proper documentation of PCA use such as pain scores, medication dosage, number of attempts and sedation scores are important to adequately assess pain control and optimize therapy. At Advocate Children's Hospital-Park Ridge, (ACH-PR) providers have anecdotally observed that documentation of PCA opioid use in the electronic health record (EHR) has been inconsistent and incomplete. The purpose of this study is to evaluate the accuracy of PCA documentation in the EHR. **Methods:** The study is a retrospective, single center chart review of all pediatric patients at the ACH-PR campus who received a PCA pump between June and August 2016. The shift totals for the amount of opioid used from the PCA that were documented in the EHR will be compared to the data from the knowledge portal to assess accuracy. The knowledge portal is an online application in which actual Alaris pump actual use data can be retrieved. The primary objective is to determine the accuracy of PCA documentation in the EHR. Accuracy is defined as greater than 95% concordance, which accounts for slight differences in documentation and recording. The secondary objective is staff compliance with the ACH pediatric PCA policy in regards to documentation and safety. Compliance will be defined as each of the specific documentation components being documented 1 hour before or 1 hour after the 4 hour mark. The safety objective is the use of naloxone for opioid reversal.

Results/Conclusion: Data collection and analysis are pending and will be presented at the Great Lakes Pharmacy Resident Conference in April 2017.

Learning Objectives:

Identify safety issues that arise with the use of patient controlled analgesia.
Discuss safety guards that can be implemented by institutions that use patient controlled analgesia.

Self Assessment Questions:

All of the following are safety issues that arise with the use of patient controlled analgesia:

- A: Look alike sound alike medications
- B: Misprogramming of pumps
- C: Multiple opioid orders
- D: All the above

What measures can institutions implement to ensure safe use of patient controlled analgesia?

- A: Drug libraries
- B: Independent double check of pump programming
- C: Limited drug choices
- D: All the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-935L05-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

INCORPORATING STUDENT PHARMACISTS IN THE ADMISSION RECONCILIATION PROCESS AT A COMMUNITY TEACHING HOSPITAL

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Purpose: Medication reconciliation is an essential part of improving patient care when a patient transitions between different levels of care within a hospital system. Up to a quarter of all prescription medications taken by patients prior to admission are not recorded correctly within the electronic medical record. Student pharmacists can play an integral role in obtaining medication histories on admission and allow pharmacists to have more time to provide other clinical services. The objective of this study was to evaluate the impact of incorporating student pharmacists in the admission reconciliation process. **Methods:** This study was a prospective, single-centered study conducted from October 17 to November 18, 2016. The study was conducted in two phases. Phase 1, a one-week period, was conducted to determine the average time for a pharmacist to conduct a medication history without student pharmacists. Phase 2, a four-week period, was conducted to evaluate the impact student pharmacists had on the admission reconciliation process. Student pharmacists were assigned to perform and document thorough medication histories. Students screened for medication related problems and made recommendations to the pharmacists to optimize patient care. The accuracy of the medication histories obtained by student pharmacists was reviewed by a clinical pharmacist. Patients admitted to the following units were excluded from the study: neonatal intensive care, pediatrics, mother/baby, labor and delivery, rehabilitation, and psychiatric. The primary outcome was to evaluate the percentage of medication histories completed by pharmacists pre and post student involvement. The secondary outcomes were to evaluate the accuracy of student pharmacist obtained medication histories, time difference between pharmacist to complete versus review a medication history, types of discrepancies observed by a pharmacist, and the types of interventions made by student pharmacists. **Results and conclusions:** Results and conclusions are currently in progress.

Learning Objectives:

Describe the current admission reconciliation process and rationale for incorporating student pharmacists in that process
Discuss the impact student pharmacists had on the admission reconciliation process

Self Assessment Questions:

Which of the following does student pharmacist involvement in the medication reconciliation process help resolve

- A Drug-related problems
- B: Drug allergy information
- C: Medication discrepancies
- D: All the above

Which of the following was the most common intervention identified by student pharmacists when performing an admission reconciliation?

- A Dose optimization
- B Education/counseling
- C Added therapy
- D Discontinued therapy

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-729L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

LINKING TO CARE: EVALUATION OF A PHARMACIST-LED POPULATION HEALTH MANAGEMENT SERVICE FOR VETERANS WITH HEPATITIS C

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Purpose Statement: In April 2016, the Veterans Health Administration dramatically increased funding for the treatment of hepatitis C. At the Madison VA, this funding is being used to purchase expensive Direct Acting Antivirals (DAAs) and open access in pharmacist-run hepatitis C clinics. This allows hepatitis C-positive Veterans with minimal liver disease or a history of substance abuse (both scenarios where DAAs were previously restricted) to receive treatment. In response to the rapid influx of treatment-eligible patients, pharmacists at the Madison VA are utilizing the VISN 12 Hepatitis C Linkage to Care dashboard to identify and refer seropositive patients to specialty care. The purpose of this study is to evaluate the effectiveness of this Linkage to Care effort through the use of this tool. **Methods:** A retrospective chart review will be completed for all patients reviewed in the Hepatitis C Linkage to Care dashboard between April 2016 and December 2016. Patients will be excluded from analysis if they were determined to be poor candidates for treatment and attempts to contact were never made. Standard baseline data will be collected, including patient age, gender, liver status, and primary care location. The primary objective of this study is to determine whether patient engagement in the linkage to care process predicts hepatitis C treatment initiation. To measure this, patients will be separated into two groups; those who received initial hepatitis C laboratory workup within 30 days of their initial linkage to care review and those who did not. Using chi-squared for analysis, groups will be evaluated by the proportion of patients starting treatment within 60 days of initial review. Secondary outcomes include other measures of engagement in the linkage to care process, including rates of successful contact, laboratory work up, and clinic attendance. **Results/Conclusions:** To be presented

Learning Objectives:

Explain the steps completed in the linkage to care process when evaluating a patient for hepatitis C treatment initiation
Describe the changes in restrictions for hepatitis C treatment initiation at the Madison VA

Self Assessment Questions:

Which of the following factors could exclude a patient from receiving hepatitis C treatment through the VA?

- A Consuming more than 4 alcoholic beverages daily
- B: An average life expectancy of 12 months or less
- C: Current IV or intranasal drug use
- D: History of cirrhosis and/or hepatocellular carcinoma

Which of the following laboratory values must be obtained prior to a patient's initial visit for treatment initiation?

- A Viral Genotype
- B Complete Blood Count
- C Liver Function Tests
- D NS5a Resistance testing

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-862L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

RESTRUCTURING A HEALTH-SYSTEM'S AMBULATORY SUPPLY CHAIN

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GLPRC Abstract UW Health operates a successful ambulatory and specialty pharmacy enterprise which consists of 13 ambulatory pharmacies and two remote dispensing sites. Through these operations and established reporting infrastructure, a robust data stream is being generated which can be leveraged for the evaluation of reimbursement and pharmaceutical cost trends. While this data is necessary for core pharmacy financial reporting and accounts receivable management, it has not been evaluated in a systematic manner with supply chain focus.

The objectives of this project involve utilizing ambulatory pharmacy dispensing data exported from vendor software; the investigators will analyze and identify trends and areas of opportunity for supply chain interventions. Using these identified trends, a database will be created to automate the data collection and analysis to produce worklists for end user action. The impact of the database and identified opportunities on cost savings and time associated with completion of tasks created will be evaluated and reported as key outcomes measures of this project. The methods of this project involve developing monthly reports on prescription dispenses, reimbursement data, percentages of brand vs. generic medication spend, and purchasing information related to product availability. The database will utilize these reports to produce daily decision support for ordering and product substitution, while allowing for tracking of product standardization and dispensing/purchasing volumes. The key deliverables of this project will be based upon financial improvement, but will serve as a blueprint for success for other academic centers interested in supply chain initiatives. The project will allow for an understanding of data evaluation and analysis, and variation reduction.

Learning Objectives:

Recognize additional supply chain areas of opportunity beyond drug shortage management.

Recall how ambulatory pharmacy solvency and population health strategies can be supported with supply chain diligence.

Self Assessment Questions:

Which of the following would be a key supply chain initiative to improve ambulatory pharmacy financial solvency?

- A Utilization of Brand name products whenever possible
- B Drug shortage management with higher cost alternative substitutic
- C Updating dispensing software pharmaceutical product prices annu
- D Identifying items to contract and purchase via secondary

2. How are population health strategies supported through supply chain diligence and improved ambulatory pharmacy profitability?

- A Increased out of pocket expense for patients
- B Limited access to prescription medications
- C Improved adherence monitoring, patient counseling, and continuity
- D Increasing the number of required prior authorizations

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-803L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ACCURACY OF INDICATION-BASED ORDERING FOR CEFEPIME AND IMPLICATIONS FOR ANTIBIOTIC MANAGEMENT AND CLINICAL OUTCOMES AMONG PATIENTS WITH PNEUMONIA

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Background: Up to 50% of all antibiotics prescribed in United States hospitals are either unnecessary or inappropriate, potentially leading to adverse events. In December, 2014, The University of Chicago Medical (UCM) implemented a requirement to select an indication when prescribing cefepime. It is unknown if this practice results in improvement of measurable outcomes associated with optimal antibiotic use, such as rate of appropriate empiric antibiotic selection and duration of therapy. Objective: The primary objective is to evaluate the impact of selecting an indication when ordering cefepime on the rate of appropriate empiric selection of antibiotics, antibiotic duration, length of stay, and in-hospital all-cause mortality. Methods: This is a single center, retrospective, observational study at a large academic medical center. Adult patients admitted between January 1, 2014 through June 30, 2014 (pre-implementation), and January 1, 2015 through June 30, 2015 (post-implementation), who were prescribed cefepime for the indication of pneumonia are included. Patients were randomized to include 250 patients in each group in order to detect a 10% difference between groups. Information regarding age, gender, utilization of additional antibiotics, dose and duration of therapy, length of stay, and in-hospital all-cause mortality is being collected. Assessment of the appropriateness of antibiotic selection and duration is based on established pneumonia treatment guidelines. Preliminary Results: In the pre-implementation group (n=25), 8 (32%) patients were prescribed inappropriate empiric antibiotics, 5 (22%) received inappropriate durations of therapy, the length-of-stay was a mean of 8.2 days, and the in-hospital all-cause mortality rate was 12% (n=3). In the post-implementation group (n=25), 3 (12%) patients were prescribed inappropriate empiric antibiotics, 3 (16%) received inappropriate durations of therapy, the length-of-stay was a mean of 11.5 days, and the in-hospital all-cause mortality rate was 24% (n=6). Additional results to be presented. Conclusions to be presented.

Learning Objectives:

Identify adverse outcomes from prescribing unnecessary or inappropriate antibiotics

Describe hospital policies that can be implemented to support optimal antibiotic use

Self Assessment Questions:

Which of the following have been identified as adverse outcomes associated with unnecessary or inappropriate antibiotic use?

- A Decrease in side effects
- B Increased risk of developing antibiotic resistance
- C Decrease in health care costs
- D All of the above

According to the CDC's Core Elements of Hospital Antimicrobial Stewardship Programs, which of the following are policies that should be implemented to support optimal antibiotic use?

- A Documentation of antibiotic dose, duration, and indication
- B Development and implementation of facility specific treatment rec
- C Requiring Infectious Disease consultations for all antibiotic course
- D A & B only

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-681L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

SKILLED NURSING FACILITY DISCHARGE BEST PRACTICES: IMPACT ON INTER-SYSTEM COMMUNICATION AND DELAYS IN CARE

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Purpose: The purpose of this quality improvement project is to implement a best practice process for skilled nursing facility (SNF) discharges through workflow standardization to reduce delays in care and improve communication across the continuum of care. **Methods:** A multi-disciplinary, inter-system steering committee was created to assess current SNF discharge workflows for nurses, health-unit clerks (HUCs), and pharmacists. The steering committee included representatives from nursing, HUCs, medicine, pharmacy, SNF administration, and UW-Health administration (nursing, pharmacy and transitions of care). Root causes for communication breakdowns were identified through this steering committee utilizing the FOCUS-PDCA methodology. A pharmacy-focused workgroup consisting of inpatient and LTC pharmacists was created to identify pharmacy-related root causes for delays in care and missed medication doses. Best practices addressing the root causes were created and vetted with the steering committee. Process improvements for nursing include: standardization of patient education and documentation. Improvements in HUC processes include: standardization of health information disclosure and updating patient demographics to include temporary contact information. Pharmacist workflow improvements include: standardization of controlled substance workflows, communication with LTC pharmacies, and prospective review of medication doses due the evening of discharge. Identified best practices will be piloted on medicine and orthopedics units. Outcome measures include: frequency of missed doses within 24 hours post-discharge, medication discrepancies between the discharge summary and SNF medication administration record, percent compliance in sending discharge hand-off from the inpatient pharmacist to the LTC pharmacist, percent of discharges the LTC pharmacy received controlled substance prescriptions within 6 hours of the patient arriving at the SNF, and percent of discharges the LTC pharmacy did not receive controlled substance prescriptions within 48 hours of the patient arriving at the SNF. **Results/Conclusions:** Results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe root causes contributing to delays in care during transitions from hospital to skilled nursing facility

Review nursing, health unit-clerk and pharmacist best practice workflow for patients discharging from hospital to skilled nursing facility

Self Assessment Questions:

Which stakeholder is necessary to include in health-system efforts to improve skilled nursing facility transitions of care?

- A: Mail order pharmacists
- B: Skilled nursing facility admission nurses
- C: Home health nurses
- D: Community pharmacists

What can inpatient pharmacists do to decrease delays in care when patients arrive at a skilled nursing facility?

- A: Review the medication profile for doses that may be needed prior
- B: Hand controlled substance prescriptions to a family member/caregiver
- C: Sign CII prescriptions
- D: Send prescriptions to a local pharmacy prior to discharge

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-773L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PHARMACY DATA DIVING: IMPACT OF THE INFORMATICS PHARMACIST ON DATA ACQUISITION AND REPORT DEVELOPMENT

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Purpose: Reports are extracts of information from a database written with a clear purpose and to a particular audience. It contains useful data that is needed in decision making and analysis. Traditionally, reports created for pharmacy use are written by non-clinical report writers, and the gap in clinical knowledge can lead to delays in report creation and data omissions or inaccuracies. Up until 2011, Hospital Sisters Health System (HSBS) had solely relied on non-clinical report writers for the development of all pharmacy reports. Identifying the impact this process had on pharmacy, our pharmacy IT team requested, and were granted access to run database queries using Microsoft Structured Query Language (SQL). Since database querying requires technical knowledge to use, the pharmacy IT team had to learn SQL in order to create reports for pharmacy. The purpose of this study is to compare the report creation turnaround time and explore the additional benefits of utilizing an informatics pharmacist to generate a variety of reports at a multi-facility health care system. **Methods:** A retrospective analysis will be conducted at HSHS utilizing ServiceNow change request data from 2012 to 2016. Any report creation, report modification, or database query request from any of our pharmacies were eligible for the study. Excluded from the study were requests for rescheduling existing reports or report access. The primary endpoint is the difference in average amount of time for a report to be created when made by the non-clinical reporting team versus informatics pharmacists. Secondary endpoints will examine the report quality, report types, and number of reports created per year. **Summary of results supporting conclusion:** Research in progress **Conclusion reached:** Research in progress

Learning Objectives:

Identify the benefits and risks of using clinical report writers.

Describe the clinical and technical work involved with generating a database query.

Self Assessment Questions:

What is a benefit of using a clinical report writer?

- A: Slower report turnaround time
- B: Decreased accuracy of data
- C: Elegant report design
- D: Adding pertinent data to report request

Which of the following is not a type of clinical decision when generating a query?

- A: Deciding which medication columns display in a report (brand/generic)
- B: Deciding to include creatinine clearance for a vancomycin utilization
- C: Deciding the number of INRs to display on a warfarin report
- D: None of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-894L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PHARMACOGENETICS IN PRACTICE: PRELIMINARY OUTCOMES AND CLINICIAN FEEDBACK ON THE MARSHFIELD CLINIC ELECTRONIC MEDICAL RECORDS AND GENOMICS (EMERGE) PHARMACOGENETICS (PGX) STUDY

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Purpose: The electronic MEDical Records and GENomics (eMERGE) Pharmacogenetics (PGx) study is a multisite pilot program focused on integration of patient genetic results into the electronic medical record (EMR), with the goal of providing medication recommendations tailored to the patients genotype. Identification of an intermediate to high risk genotype for a given drug-gene pair may prevent adverse drug reactions and/or aid clinicians in selecting optimal therapy. The goals of the present study are to determine outcomes of patients enrolled in the eMERGE PGx project who were taking warfarin and had pharmacogenetic (PGx) alerts fire in the EMR when warfarin was prescribed between November 2014 - June 2016 (Phase I), and to assess clinician feedback regarding comprehension and utility of the EMR PGx alerts (Phase II). **Methods:** Phase I (eMERGE PGx Outcomes) is a retrospective descriptive analysis of the eMERGE PGx cohort with fired electronic alerts. Phase 1 analysis will include manual electronic chart review of up to 28 warfarin, 4 simvastatin, and 1 clopidogrel patients. Intermediate to high risk genotype patient data will be quantified. Analysis of the eMERGE PGx pre and post participant survey results will be conducted. Phase II (Clinician Feedback) is a prospective observational cross-sectional electronic survey of Marshfield Clinic clinicians who elect to participate in a REDCap survey regarding the PGx alert flag based upon either (1) their past experience with the alert (Group A) or (2) a case scenario with a simulated PGx alert flag (Group B). **Results/Conclusions:** Data collection is currently in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the proportion of eMERGE PGx subjects with an intermediate to high risk genotype and discuss the potential impact of these findings
Review clinician-perceived benefits and barriers to implementation of clinical pharmacogenetics at Marshfield Clinic

Self Assessment Questions:

Which of the following statements is true?

- A: Intermediate to high risk genotype identification is necessary, because
- B: Identification of intermediate to high risk genotype for a given drug-
- C: Intermediate to high risk genotype identification is not at all helpful
- D: Intermediate to high risk genotype identification is not at all helpful

Which of the following statements is true?

- A: Clinical pharmacogenetic implementation is commonplace at many
- B: Clinical pharmacogenetic implementation is easy and cost-effective
- C: Clinical pharmacogenetic implementation has the potential to optimize
- D: Integration of clinical pharmacogenetic data into the electronic me

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-939L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

RIVAROXABAN VERSUS ENOXAPARIN FOR VENOUS THROMBOPROPHYLAXIS IN AN ADULT TRAUMA POPULATION

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Background: Venous thromboembolism (VTE) is a life-threatening complication in orthopedic and traumatically injured patients. VTE prophylaxis has been most commonly provided with subcutaneous enoxaparin. Rivaroxaban, approved for VTE prophylaxis in patients undergoing elective orthopedic surgery, has also been used in these high-risk trauma patients. **Methods:** Charts of adult trauma and ortho-trauma patients receiving prophylactic doses of enoxaparin or rivaroxaban were retrospectively evaluated from 01/01/2013 to 05/31/2016. Exclusion criteria were therapeutic anticoagulation or renal failure upon admission. Patients were matched on age, injury severity score (ISS), and whether the mechanism of injury was blunt or penetrating. The primary outcome was the difference in acute VTE at 6 months after the date of admission, with the primary hypothesis that rivaroxaban would be non-inferior to enoxaparin. Secondary outcomes included the difference in mortality during hospitalization, hospital length of stay, and major or minor bleeding. **Results:** 2,106 patients were included with a mean (standard deviation) age of 49.19 years, ISS 8.5, and a blunt injury experienced by 95% of patients. Acute VTE was identified in 20 of 1053 patients who received prophylactic rivaroxaban and 18 of 1053 patients who received prophylactic enoxaparin (1.9% vs. 1.7%, one-sided p=0.439). For those with VTE, weight did not differ: rivaroxaban 94.7 ± 27.6 kg vs. enoxaparin 110.1 ± 28.1 kg (p=0.098). Mortality during hospitalization occurred in zero patients with rivaroxaban and 11 patients with enoxaparin (0% vs. 1.04%, p<0.001). Length of hospitalization was 4.2 ± 3.9 days for patients with rivaroxaban and 5.3 ± 5.4 days for patients with enoxaparin (p<0.001). Major bleeding occurred in 2 patients with rivaroxaban and 6 patients with enoxaparin therapy (0.19% vs. 0.57%, p=0.29). Minor bleeding is still being evaluated. **Conclusion:** As data is still being currently evaluated, conclusion will be provided at the Great Lakes Pharmacy Research Conference.

Learning Objectives:

Identify appropriate pharmacologic options for venous thromboembolism (VTE) prophylaxis in an adult patient
Recognize the importance of the injury severity score in an adult trauma or ortho-trauma population

Self Assessment Questions:

Which of the following are appropriate pharmacologic options for VTE prophylaxis in an adult patient?

- A: Heparin 5000 units subcutaneously q8h
- B: Enoxaparin 30 mg subcutaneously q12h
- C: Rivaroxaban 10 mg PO q24h
- D: All of the above

Which of the following scoring systems is a component of the injury severity score?

- A: Actual injury score
- B: Abbreviated injury score
- C: Abdominal injury score
- D: Anteriorly-located injury score

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-575L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

AZTREONAM USAGE IN PENICILLIN-ALLERGIC PATIENTS: ASSESSING THE IMPLEMENTATION OF A PENICILLIN ALLERGY GUIDELINE

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Purpose: Reported penicillin allergies are associated with increased use of alternative antibiotics that may be broader, less effective, and more costly. In March 2015, a penicillin allergy guideline was implemented at a community teaching hospital to assist clinicians in properly assessing patient-reported penicillin allergies as well as antibiotic prescribing. The primary objective of this study was to examine the impact of the penicillin allergy guideline by measuring aztreonam usage prior to and after guideline implementation.

Methods: Electronic medical records were evaluated for 317 patients who received at least one dose of aztreonam from October 1, 2014 to December 31, 2016. The primary outcome was aztreonam usage measured by days of therapy per 1000 patient-days at risk. Secondary outcomes included the safety of alternative beta-lactam antibiotic usage assessed by adverse event documentation, estimated length of stay, number of pharmacist clinical interventions, and potential drug cost savings. **Results:** There were 200 patients in the pre-intervention group (October 1, 2014 - October 31, 2015) and 117 patients in the post intervention group (November 1, 2015 - December 31, 2016). The days of therapy per 1000 patient-days at risk decreased from 10.8 days pre-guideline implementation to 3.5 days post-guideline implementation ($p=0.0039$). One out of 117 post-implementation patients developed hives after a cefepime test dose of 100 mg and did not receive the remainder of the one gram dose. The estimated length of stay decreased from 8.9 to 6.3 days ($p=0.0036$). The number of pharmacist clinical interventions increased post-implementation of the guideline from 28% to 47% ($p<0.001$). Using alternative beta-lactam antibiotics would have led to an estimated, extrapolated annual drug cost savings of \$76,000 - \$87,000. **Conclusion:** Implementation of the penicillin allergy guideline led to decreased aztreonam usage, decreased length of stay, increased pharmacist clinical interventions, and drug cost savings.

Learning Objectives:

Review drug allergy reactions and cross-sensitivity of beta-lactam antibiotics and penicillin
Discuss the benefits gained from implementation of a penicillin allergy guideline

Self Assessment Questions:

Of the patients who report a penicillin allergy, studies show only about _____% of these patients are truly allergic.

- A 40%
- B: 10%
- C: 1%
- D: 70%

AF is a 73 year old female from a nursing home presents to the Emergency Department with complaints of fever and productive cough. She was recently admitted 2 months ago. Her chart shows an allergy to

- A IV vancomycin + IV levofloxacin + IV aztreonam
- B IV cefepime + IV piperacillin-tazobactam
- C IV vancomycin + IV cefepime + IV levofloxacin
- D IV ceftriaxone + IV azithromycin

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-385L01-P
Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT ON DIABETES CONTROL UTILIZING A MULTIDISCIPLINARY APPROACH TO THE MANAGEMENT OF UNCONTROLLED TYPE 2 DIABETES INVOLVING PHARMACIST TELEPHONIC INTERVENTION WITHIN AN INTERNAL MEDICINE CLINIC

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Purpose: Intensification of therapy for individuals with diabetes remains suboptimal despite strong clinical evidence of a reduction in adverse outcomes. This may be due to complicated management plans and patient barriers, leading to confusion about health care related issues. Pharmacists may be positioned to bridge this gap. Our study seeks to determine the benefit of addressing the issues of uncontrolled type 2 diabetes (T2DM) through the collaboration of a multidisciplinary care model utilizing pharmacist telephonic intervention for T2DM internal medicine patients with Hemoglobin A1C (HbA1C) above goal (HbA1c > 9%). **Methods:** This is a single-center prospective observational study designed to evaluate HbA1C differences in patients 18-79 years of age with uncontrolled T2DM (HbA1c > 9%) who utilize clinical pharmacists in a multidisciplinary team approach compared to patients receiving usual medical care over 9-12 months. Secondary outcomes include change in blood pressure and fasting lipid panel over this same time period. Exclusion criteria include pregnancy, type 1 diabetes, non-English speaking, cognitive impairment or hospice care. Up to 100 patients will be randomized into either an intervention or control arm. Assuming a 20% dropout rate of 20 patients ($n=80$), we will have 79% power to detect a difference in HbA1C reduction of 0.6% between groups. Using a standardized script, pharmacists will contact the patient telephonically and perform an initial full medication reconciliation and medication therapy review. Subsequent calls occur every 4-6 weeks until the follow-up period is reached. Patients non-adherent or with out-of-range blood glucose or blood pressure values will be referred back to their providers with drug therapy recommendations. A 6 month interim analysis will determine if study-end will be appropriate at 9 or 12 months. **Results/Conclusions:** Data collection is currently in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify patient barriers to the management of uncontrolled type 2 diabetes
Discuss ways pharmacists can contribute to addressing issues associated with the management of uncontrolled type 2 diabetes

Self Assessment Questions:

Which of the following is a patient barrier in the management of uncontrolled type 2 diabetes?

- A Having a high HbA1C
- B: Access to monthly phone calls from a pharmacist
- C: Unable to afford office visits
- D: High patient activation

How can pharmacists help to address issues of uncontrolled type 2 diabetes?

- A Recommend the patient add on dietary and herbal supplements
- B Tell the patient their physician does not know what they are doing
- C Educate on the importance and purpose of their medications
- D Explain to patients that diabetes can go away over time by itself

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-475L01-P
Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF NURSE-DRIVEN DIABETIC KETOACIDOSIS (DKA) INSULIN INFUSION CALCULATOR ON THE RATE OF HYPOGLYCEMIA

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Diabetic ketoacidosis (DKA) is an acute complication of diabetes that manifests as dehydration, hyperglycemia, and acidosis. The incidence of hospitalization due to DKA as the primary diagnosis continues to increase and management can be challenging. Patients often need to be managed on continuous infusion insulin that requires hourly blood glucose monitoring and dose adjustments; any delay in management could lead to hypoglycemic events. A previous analysis at University of Chicago Medicine (UCM) showed 46% of patients admitted for DKA management experienced hypoglycemia. In November 2015, a DKA calculator was added to the insulin infusion protocol at UCM, which allowed trained nurses to independently calculate and adjust the insulin infusion rate. The objective for conducting this study is to evaluate the impact of the new DKA calculator. In this single center, observational study, a retrospective chart review was performed for adult patients with primary admission diagnosis of DKA. The primary endpoint was the incidence of hypoglycemia and secondary endpoints include the incidence of severe hypoglycemia, time to DKA resolution, intensive care unit admission rate, length of stay, and rate of hypokalemia and profound hypokalemia. Before the implementation of the DKA calculator the incidence of hypoglycemia was 46% with incidence of severe hypoglycemia being 23%. The mean time to DKA resolution was 19.6 14 hours and length of stay was 3.46 3.86 days. After implementation, preliminary analysis of 20 patients showed that the rate of hypoglycemia and severe hypoglycemia were both reduced by 57%. The mean time to DKA resolution was 23.7 19 hours and length of stay was 4.17 2.62 days. Preliminary results demonstrate a reduced incidence of hypoglycemia and severe hypoglycemia with the implementation of DKA calculator for adult patients presenting with DKA.

Learning Objectives:

Describe the management of diabetic ketoacidosis (DKA) and recognize its challenges

Discuss the impact of a nurse-driven DKA insulin infusion calculator for the treatment of DKA

Self Assessment Questions:

Which of the following statement regarding the management of DKA is correct?

- A Patients on continuous insulin infusion do not require intensive monitoring
- B The management of DKA includes fluid, insulin, and electrolyte management
- C ICU admission due to DKA is associated with decreased mortality
- D Most patients who are admitted for DKA do not require continuous monitoring

Which outcome is anticipated after the implementation of an insulin infusion calculator at UCM?

- A Decreased incidence of hypokalemia
- B Decreased ICU admission
- C Decreased incidence of hypoglycemia and severe hypoglycemia
- D Longer time to DKA resolution

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-317L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DEVELOPING A RESIDENCY-TRACK LONGITUDINAL ADVANCED PHARMACY PRACTICE EXPERIENCE PROGRAM FOR AURORA HEALTH CARE

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Purpose: A residency-track longitudinal advanced pharmacy practice experience (RT-LAPPE) program is a method of delivering advanced pharmacy practice experience (APPE) education. It is typically administered by rotation sites rather than by schools of pharmacy. The RT-LAPPE program will simultaneously benefit the students and the Aurora Health Care (AHC) pharmacy department. The objective of this project is to design and implement a RT-LAPPE program for AHC.

Methods: The methods of this project were divided into research, design, and communication strategies. During the research phase, a literature search was performed searching for other centers who administer longitudinal APPE programs. Additionally, programs were contacted to inquire about their longitudinal APPE programs. In the next phase, the framework for the AHC RT-LAPPE program was developed. Workflows were designed around a longitudinal project, a presentation or publication, mentorship, and preparing students for residency. The final phase of the project included communication of the new program to the RT-LAPPE students and the program coordinator. To do so, the AHC RT-LAPPE program manual was developed along with tools for resident mentors and the program coordinator to guide the RT-LAPPE students through the program. Following their development, these pieces of the project were discussed with key administrators of the program. Results: The framework for a RT-LAPPE program was developed for AHC and a program manual was created. Conclusion: AHC will host five RT-LAPPE students in the first year of the program. These students will be referred to the program manual to meet program requirements.

Learning Objectives:

Describe the benefits of a residency-track LAPPE program.

Recall the components of the Aurora Health Care residency-track LAPPE program.

Self Assessment Questions:

Which of the following is a benefit of the Aurora Health Care RT-LAPPE program?

- A Limits the student's exposure to a variety of rotation sites
- B Increases time needed to orient students
- C Greater exposure of the student to pharmacy services at Aurora Health Care
- D Limits the student's experience with current pharmacy residents at Aurora Health Care

Which of the following is a requirement of the Aurora Health Care RT-LAPPE program?

- A Complete a longitudinal project
- B Present at the Midyear Clinical Meeting
- C Publish the results of the longitudinal project
- D Present at the Pharmacy Society of Wisconsin Educational Conference

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-734L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

REDUCTION OF INAPPROPRIATE USE OF STRESS ULCER PROPHYLAXIS THROUGH PHARMACIST CONDUCTED EDUCATION IN AN ACUTE CARE SETTING

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Purpose: Stress ulcer prophylaxis (SUP) therapy is recommended in certain critically ill patients to prevent gastrointestinal bleeding which ultimately affects the length of stay and mortality. Currently, medications for SUP are prescribed to a majority of admitted patients, often unnecessarily. Studies show that the overuse of these medications is not without risks. Both proton pump inhibitors (PPI) and histamine H2-receptor antagonists (H2 blocker) have an increased rate of Clostridium difficile infection (CDI) in hospitalized patients. Criteria for appropriate SUP use were obtained from the 1999 ASHP SUP guidelines and are defined as follows: coagulopathy (defined as platelet count less than 50,000, INR greater than 1.5, PTT greater than 2 times control value), mechanical ventilation for greater than 48 hours, history of GI ulceration or bleeding within the past year, traumatic brain injury/traumatic spinal cord injury/ burn injury, or two or more of the following minor criteria; sepsis, ICU stay greater than 1 week, occult GI bleeding for 6 or more days, and glucocorticoid therapy defined as greater than 250mg hydrocortisone or equivalent. The objective of this study is to evaluate the use of these medications at Franciscan Health Lafayette (FHL) and take actions to reduce unnecessary use. **Methods:** This study is a comparison of retrospective chart reviews for the use of famotidine and pantoprazole used in all inpatient units at FHL for the week of July 24th through July 31st 2016 and February 19th through 25th 2017. The primary endpoint of this study is the number of inappropriately prescribed SUP agents. Secondary outcomes include the number of patients with PPI or H2 blocker as prior to admission medication, incidence of CDI, incidence of GI bleed and unnecessary addition of SUP agents upon discharge. **Results/Conclusion:** Final results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize risks of inappropriate SUP use.
Identify current ASHP criteria for appropriate SUP agent use.

Self Assessment Questions:

Which of these is a potential side effect of PPI use?

- A: Gastrointestinal bleeding
- B: Clostridium difficile infection
- C: Liver disease
- D: Arthritis

Which of the following patients should receive SUP according to the ASHP guidelines?

- A: Patient who has been on a ventilator for 1.5 days.
- B: Patient who had a GI bleed 4 years ago.
- C: Patient who is septic and is on methylprednisolone 40mg twice da
- D: Patient whose platelets are 63,000.

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-493L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

RETROSPECTIVE ANALYSIS OF ROMIDEPSIN FOR THE TREATMENT OF RELAPSED AND REFRACTORY T-CELL LYMPHOMAS

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Background/Rationale: Peripheral T-cell lymphoma (PTCL) and cutaneous T-cell lymphoma (CTCL) are relatively uncommon malignancies, which make up 10% and 2%, respectively, of non-Hodgkin lymphoma cases in the United States. A majority of patients with PTCL present with advanced stage disease and have a poor prognosis. Similarly, in patients with advanced-stage CTCL, the disease is often progressive with a short median duration of response. One potential treatment option for patients with relapsed or refractory PTCL and CTCL is romidepsin, a histone deacetylase inhibitor, which has shown overall response rates up to 38% and 35% and median response duration of 17 and 15 months, respectively. Given the limited therapy approaches, concurrent treatments and maintenance dose-sparing strategies have been utilized at The James Cancer Hospital to improve and prolong disease response. **Objectives:** The primary objective was to determine response and tolerability to romidepsin as defined by median progression-free survival, overall survival, and time to next treatment. Secondary objectives include: the frequency and severity of adverse effects, and evaluation of correlative factors including concomitant medications, sites of disease, or prior therapies on disease outcomes. **Methods:** A single-center, retrospective, medical chart review was utilized to evaluate patients age 18-89 years old treated with at least one dose of romidepsin between January 1, 2009 and July 31, 2016 for relapsed or refractory T-cell lymphoma. For the efficacy assessment, patients must have received at least one full cycle (3 doses). Baseline characteristics collected include patient-, disease-, and medication-specific information. Response was assessed based on published criteria for PTCL and CTCL. Progression was noted by physician-documented change or completion of therapy. Adverse effect severity was determined by Common Terminology Criteria for Adverse Events (CTCAE, version 4.0). **Results:** The final results and conclusions of this study will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe efficacy and safety outcomes of CTCL and PTCL patients treated with romidepsin
Discuss romidepsin therapy approaches including maintenance dose-sparing strategies and concurrent treatments

Self Assessment Questions:

Which of the following is NOT a common side effect of romidepsin?

- A: Myelosuppression
- B: Nausea
- C: Neuropathic pain
- D: EKG changes

Standard dosing for romidepsin includes:

- A: 14 mg/m² IV on days 1, 8, and 15 of a 28-day treatment cycle
- B: 14 mg/m² IV on day 1 of a 28-day treatment cycle
- C: 14 mg/m² IV on days 1 and 15 of a 28-day treatment cycle
- D: 14 mg/m² IV on day 1 of a 21-day treatment cycle

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-695L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF THE IMPACT OF THYROID DYSFUNCTION DEVELOPMENT IN PATIENTS RECEIVING IMMUNOTHERAPY WITH PD1 AND CTLA4 INHIBITORS

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Statement of the purpose: Use of immunotherapy, including CTLA-4 and PD-1 checkpoint inhibitors, has been expanding in the management of solid tumor and hematologic malignancies. There is interest in whether the development of thyroid dysfunction may be a biomarker of response to immunotherapy treatment. The purpose of this study was to evaluate the objective response rate (ORR), in patients treated with immunotherapies who developed thyroid dysfunction compared with patients who did not. Statement of methods used: This study was approved by the institutional review board. For this cross-sectional study with a nested case-control, patients were identified, with administration records through the electronic medical record, if they received ipilimumab (Yervoy), nivolumab (Opdivo) or pembrolizumab (Keytruda) between 3/25/2011 to 9/30/2016 at the Henry Ford Health System.

Subjects were grouped according to the development of thyroid dysfunction, using the CTCAE v4.03. Case patients were those who

developed any grade of hypothyroidism or hyperthyroidism, compared to control patients that maintained normal thyroid function throughout treatment. The primary analysis will be evaluating ORR, defined as the proportion of patients who achieved a complete response or partial response based on RECIST v1.1, in patients treated with immunotherapies who developed thyroid dysfunction compared with patients who did not. Summary of (preliminary) results to support conclusion: A total of 154 patients were identified during the 5-year study period. At an interim analysis of 50 patients, 10 of 13 patients who developed thyroid dysfunction had an evaluable response. ORR for case patients who developed thyroid dysfunction was 50% compared with 8% in the control group, with a combined ORR and stable disease rate of 80% and 58%, respectively. Conclusions reached: Patients who received treatment with immunotherapy and developed thyroid dysfunction had a higher ORR and combined ORR and stable disease rate compared with those who did not develop thyroid dysfunction.

Learning Objectives:

Describe the mechanism of checkpoint inhibition through programmed death-1 (PD-1) and CTLA-4.

Explain the biological premise for the correlation between immune-mediated adverse events and better responses with immunotherapy.

Self Assessment Questions:

Which of the following medications provides CTLA-4 inhibition?

- A: Pembrolizumab
- B: Nivolumab
- C: Atezolizumab
- D: Ipilimumab

Which immune-mediated adverse event has been associated with treatment response in patients treated with interleukin-2?

- A: Endocrinopathies
- B: Nephritis
- C: Dermatitis
- D: Colitis

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-485L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

RETROSPECTIVE ANALYSIS OF A POPULATION-BASED MULTIDISCIPLINARY AMBULATORY DIABETES OUTREACH PROGRAM

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The Ambulatory Diabetes Outreach Program (ADOP) was implemented at the Froedtert and the Medical College of Wisconsin Primary Care Clinics on August 1, 2016. This program expands the primary care team supporting patients with uncontrolled type 2 diabetes. In collaboration with primary care providers, the multidisciplinary team composed of pharmacists, care coordination nurses, a certified diabetes educator, and a social worker seeks to improve diabetes management. The team achieves this goal by managing pharmacotherapy, identifying and addressing barriers, and coaching patients on lifestyle modifications. Patients were included in the program if they had an glycohemoglobin A1c (A1c) greater than 9% and were enrolled in an insurance plan affiliated with the institutions Accountable Care Organization (ACO). Pharmacists work under a system-wide collaborative practice agreement whereby they can prescribe and adjust medications related to diabetes, hypertension, atherosclerotic cardiovascular disease, and dyslipidemia.

The purpose of this study is to evaluate ADOP on attaining the patients specific A1c goal and meeting the Wisconsin Collaborative Health Care Quality (WCHQ) metric of A1c < 8% in patients with type 2 diabetes. Secondary outcomes include the WCHQ diabetes bundle metrics.

Data was pulled from the electronic health record to assess goals met, number of encounters, and progress towards meeting the WCHQ diabetes bundle metrics. A total of 106 patients were included in the study. After three months of management, ADOP decreased A1c values by an average of 1.6%. The ADOP team connected with patients an average of three times per month. In conclusion, ADOP is effective in reducing A1c and provides increased healthcare access for patients.

Learning Objectives:

Define the metrics of the Wisconsin Collaborative Healthcare Quality (WCHQ) diabetes bundle.

Recognize the average change in A1c after three and six months of management within the Ambulatory Diabetes Outreach Program (ADOP)

Self Assessment Questions:

Which of the following is part of the Wisconsin Collaborative Health Care Quality (WCHQ) diabetes bundle?

- A: Most recent A1c blood sugar level controlled to less than 8.0%
- B: Most recent blood pressure controlled at less than 130/80 mmHg
- C: High-intensity statin use in patients ages 40 through 75
- D: Blood sugar testing four times daily

What is the average number of times the ADOP team connected with each patient per month?

- A: One
- B: Two
- C: Three
- D: Four

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-360L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

UTILIZATION OF GABAPENTIN IN AN ALCOHOL WITHDRAWAL PROTOCOL AT A COMMUNITY HOSPITAL

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Purpose: Recent literature suggests that gabapentin is effective in the management of alcohol withdrawal. The utilization of gabapentin has shown several benefits when compared to benzodiazepines. This study compared the outcomes between patients treated with a lorazepam based protocol, and those treated with a gabapentin based protocol. The primary objective is to implement a new alcohol withdrawal protocol that utilizes gabapentin for effective symptom management. **Methods:** This study compared differences between alcohol withdrawal management at All Saints a 200 bed hospital and St. Lukes a 70 bed detoxification unit. At the All Saints site patients are treated with a traditional lorazepam based Clinical Institute Withdrawal Assessment (CIWA) protocol, while at the St. Lukes site they are treated with a gabapentin plus as needed chlorthalidone protocol. This was a retrospective study. The primary outcome evaluated was the time it took for the patient to reach a CIWA score of 7 or less for 24 hours. The secondary outcomes included total benzodiazepine and gabapentin dosage used, length of stay, and if any seizures or delirium were experienced. Patients were excluded if they were directly admitted to the ICU, or had end stage liver or kidney disease. Patients were risk stratified using the Prediction of Alcohol Withdrawal Severity Scale (PAWSS). **Preliminary Results:** When the All Saints group was compared to the St. Lukes group with regards to the primary outcome of time to a CIWA of 7 or less there was no statistical difference ($p=0.872$). In total there were 137 patients, 51 in the All Saints group and 86 in the St. Lukes group. Additional results will be presented at the Great Lakes Residency Conference. **Conclusion:** Based upon the results of this study the implementation of a new inpatient protocol that utilizes titrated gabapentin starting at 300 mg every 6 hours is appropriate.

Learning Objectives:

Describe and explain the role of gabapentin in the treatment of alcohol withdrawal.

Review the results of the project and outline how they can relate to a new alcohol withdrawal treatment protocol.

Self Assessment Questions:

What role (mechanism of action) does gabapentin play in the treatment of alcohol withdrawal?

- A It affects the synthesis of endogenous GABA and glutamate which
- B: It binds directly to the GABA receptor and activates the receptor to
- C: It functions almost identically to the benzodiazepines and therefore
- D: It serves no medical purpose and the observed effects are only placebo

What is the best class of medications to be used in conjunction with gabapentin in the treatment of alcohol withdrawal?

- A Atypical antipsychotics
- B Nothing
- C Benzodiazepines
- D Opioids

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-442L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTING ADDITIONAL PHARMACY SERVICES IN AN OUTPATIENT PHARMACY

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Purpose: Traditionally, approximately 70% of a community pharmacist's time has been spent on medication dispensing and counseling. The implementation of pharmacy clinical services has demonstrated a beneficial impact on patient outcomes. The purpose of this project is to implement additional pharmacy clinical services in an outpatient pharmacy. **Methods:** Pharmacy department leadership set a goal to expand the outpatient pharmacy's bedside prescription delivery service to include deliveries to the on-site oncology infusion clinic. Since additional pharmacy caregivers were not added to help expand the delivery service, the existing pharmacy workflow was assessed to determine which pharmacy technician duties could be redistributed to off-peak hours. After analyzing the pharmacy's prescription volume, it was determined that a significant portion of the prescription volume during peak hours is attributed to labor and delivery discharges. The labor and delivery prescriptions were analyzed to understand variances in medications and quantities ordered, and a standardized order panel was created as a tool for providers ordering prescriptions at discharge. The pharmacy workflow was adjusted to allow for filling and pre-packaging of the standardized labor and delivery discharge medications during off-peak hours. This redistribution of the workload allowed for additional pharmacy technicians to be available during peak hours to expand the prescription delivery service. The workflow in the oncology clinic was observed and buy-in was obtained from oncology providers and oncology clinic caregivers. Pharmacy caregivers were trained and a modified prescription delivery service was implemented to include chairside prescription delivery to the oncology clinic. The modified workflow for the prescription delivery service will be analyzed on an ongoing basis for areas of improvement, and prescription capture data will be reviewed for the oncology clinic providers. **Results and conclusion:** Results are being collected and conclusions will be presented in the future.

Learning Objectives:

Identify two possible barriers to expanding an existing pharmacy clinical service in an outpatient pharmacy.

Describe a method that may help overcome barriers encountered during the implementation of a new pharmacy service.

Self Assessment Questions:

What might be barriers to expanding an existing pharmacy clinical service?

- A Good working relationship with other healthcare professionals and
- B: Insufficient time in current pharmacy workflow and caregiver buy-in
- C: Too many caregivers and a newly remodeled pharmacy
- D: Sufficient technology and sufficient time in current pharmacy work

What could be done to overcome the barrier of poor caregiver buy-in?

- A Discuss repercussions for caregivers if the pharmacy clinical service
- B Bribe caregivers to help implement the new pharmacy clinical service
- C Describe the anticipated beneficial impact of the new pharmacy clinical
- D Ignore poor caregiver buy-in and implement additional pharmacy clinical

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-791L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF COMMUNITY PHARMACY POST-DISCHARGE CARE IN PATIENTS WITH OR AT RISK OF VENOUS THROMBOEMBOLISM

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Purpose: The objective of this study is to determine if a community pharmacy driven transition of care program that includes bedside medication delivery, medication therapy management services, and a 30 day follow-up, decreases hospital readmissions in patients with or at risk of developing a venous thromboembolism. Secondary objectives include determining if these services increase medication adherence and patient satisfaction. **Methods:** The design of the study is a prospective, quasi-experimental cohort pilot study. The setting will include select community pharmacy chain stores, including a location within a local hospital. The study population will consist of adult patients who discharged from a local hospital between October and December 2016 with a diagnosis of venous thromboembolism or atrial fibrillation. Inclusion criteria include 1) age 18 years or older, 2) participation in the bedside medication delivery program, and 3) discharged with an anticoagulant medication prescription. Interventions include 4 post-discharge telephone calls, a comprehensive medication review, and 3 electronic patient education modules occurring over a 30 day timeframe post discharge. Data collection will include patient demographics, medication fill information, the number of subjects readmitted to the hospital within 30 days of discharge, and patient satisfaction. Collected data will be compared to historical hospital controls. Medication adherence will be measured by a standard accepted mathematical calculation for Proportion of Days Covered. **Preliminary Results:** The project is currently awaiting IRB approval. The investigators anticipate the study interventions to decrease hospital readmission and increase patient satisfaction and medication adherence in comparison to historical hospital controls. **Conclusions:** Results and conclusions to be presented at the 2017 Great Lakes Pharmacy Resident Conference

Learning Objectives:

Describe the benefits of pharmacist involvement with patients discharged on anticoagulant medication.

Outline a transitions of care model for community pharmacists to provide care to post-discharge patients on an anticoagulant.

Self Assessment Questions:

Pharmacist-managed DVT programs:

- A Improve transitions of care and patient satisfaction
- B: Have been shown to be ineffective and a waste of resources
- C: Provide patients with detrimental care
- D: Are not opportunities for pharmacists to provide transitions of care

A community pharmacist transitions of care model for post-discharge patients on anticoagulants should include:

- A Comprehensive medication reviews and patient education
- B Data collection on patient demographics
- C IRB approval
- D Hospital rates of readmission

Q1 Answer: A Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-393L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPROVING PHARMACIST SATISFACTION THROUGH IMPLEMENTATION OF AN INPATIENT ONCOLOGY SPECIFIC SCORING TOOL

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PURPOSE: As inpatient volume and patient complexity continue to increase, healthcare professionals are turning to electronic risk-stratification systems to prioritize patient care and monitoring tasks. Froedtert and the Medical College of Wisconsin pharmacists currently utilize an electronic scoring tool (iClipboard) that prioritizes pharmacist workflow based on pre-specified, patient-centric aspects of their current medical condition. Surveying of inpatient/cross-trained oncology pharmacists revealed aspects of oncology specific patient care that were overlooked by the iClipboard. The goal of this project is to design and implement a tailored scoring tool (oncClipboard) for use in inpatient oncology areas of practice. Expected results included improved pharmacist workflow and increased pharmacist satisfaction in the areas of supportive care and chemotherapy monitoring. Secondary goals of this project include expedition of chemotherapy order verification and improved pharmacist management of both patient pain control and nausea/vomiting. **METHODS:** An electronic pre-implementation survey was distributed to 18 inpatient oncology and cross-trained medicine/oncology pharmacists across our health system to assess pharmacist satisfaction in regards to multiple aspects of the current scoring tool. These questions utilized a Likert scale to establish a baseline assessment of the current scoring system. These responses (response rate: 83.3%) were used to design, build, and implement the oncClipboard. **RESULTS/CONCLUSIONS:** Pre-implementation responses indicated that overall pharmacist satisfaction with the current scoring tool was 3.26 on a Likert Scale (1=very dissatisfied, 5=very satisfied). Interventions are ongoing and results will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss areas of oncology specific patient care where pharmacists can intervene to optimize therapy management

Describe how aspects of oncology specific patient care are prioritized using an electronic scoring tool

Self Assessment Questions:

Chemotherapy induced nausea and vomiting and cancer pain is closely linked to incidence of which of the following?

- A Depression
- B: Allergic Reaction
- C: Hyperkalemia
- D: Hypertension

Which aspect of patient care specific to the oncology population was incorporated into the scoring system utilized by the oncClipboard?

- A Continuous Renal Replacement Therapy
- B Supportive Care
- C Vasopressors
- D Sedation

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-772L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ASSESSING THE APPROPRIATENESS OF EMPIRIC BROAD SPECTRUM ANTIBIOTICS IN HEALTHCARE ASSOCIATED PNEUMONIA PATIENTS IN THE EMERGENCY DEPARTMENT: A RETROSPECTIVE EPIDEMIOLOGICAL STUDY

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Purpose: The purpose of this study is to determine the proportion of patients empirically started on broad spectrum antibiotics for health-care associated pneumonia (HCAP) in the emergency department (ED) whose final cultures did not require broad spectrum nosocomial coverage. HCAP is commonly treated in the ED in patients with recent health-care exposure who may have an infection of the lungs. The 2005 Infectious Diseases Society of America (IDSA) Guidelines for the management of Hospital-Acquired Pneumonia (HAP)/Ventilator-Associated Pneumonia (VAP)/Health-Care Associated Pneumonia (HCAP) recommended that these patients receive broad-spectrum antibiotics, in contrast to patients without nosocomial risk factors in which broad spectrum therapy is not indicated. However, the updated 2016 HAP/VAP guidelines no longer address the HCAP designation due to new studies published since the previous guideline suggesting that empiric broad spectrum antibiotics may not be needed in this subset of patients. This leaves a current gap in understanding the appropriate empiric management of this patient population. **Methods:** This is an observational retrospective epidemiological chart review study that will assess the treatment of patients with HCAP between September 1, 2014 and January 31, 2017. Patients will be included who were admitted to Northwestern Memorial Hospital (NMH) through the ED with at least one antibiotic ordered with an indication for HCAP. Patients will be assessed for risk factors for HCAP, antibiotics administered, and final cultures isolated. We hope that this information will help us better understand the patient population and treatment of patients with HCAP at NMH. **Results/Conclusions:** Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the accuracy of the current definition of HCAP in assessing the need for empiric broad spectrum antibiotic initiation in the ED.
Identify the proportion of HCAP patients who received unnecessary broad spectrum empiric antibiotics in the ED.

Self Assessment Questions:

Which of these follows recommendations for the treatment of HCAP based off the 2005 HAP/HCAP/VAP Guidelines?

- A: Piperacillin/tazobactam alone
- B: Vancomycin IV + Cefepime IV
- C: Ceftriaxone IV + Azithromycin IV
- D: Cefazolin IV + Levofloxacin IV

Which of these is a risk factor for MDR organisms based off the 2005 HAP/HCAP/VAP Guidelines?

- A: Recent antibiotic use within 90 days
- B: Presentation from home
- C: WBC >10000/mm³
- D: Positive procalcitonin

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-558L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

OPTIMAL NOREPINEPHRINE-EQUIVALENT DOSE TO INITIATE EPINEPHRINE IN PATIENTS WITH SEPTIC SHOCK

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Purpose: The 2012 Surviving Sepsis Campaign recommends norepinephrine as the first-line vasopressor for septic shock with epinephrine, vasopressin, or phenylephrine as potential second-line agents. The specific norepinephrine dose at which a second agent should be added has not yet been identified. The addition of a second vasopressor has occurred at a broad range of doses in literature and is driven mainly by clinician preference. Given the varied approaches, improvement in patient outcomes can likely be achieved by better understanding vasopressor dosing. The aim of this study is to determine the optimal norepinephrine-equivalent dose at which epinephrine should be initiated in patients with septic shock. **Methods:** The primary objective of this study is to determine the optimal norepinephrine-equivalent dose at which epinephrine initiation was associated with hemodynamic stability in septic shock patients. Secondly, two cohorts of patients will be identified: optimal norepinephrine-equivalent dose and suboptimal norepinephrine-equivalent dose. Differences between the two cohorts in the time to achieve mean arterial pressure goal, shock-free survival, ICU-free days, hospital length of stay, 48 hour change in sequential organ failure assessment score from baseline, and safety outcomes will be determined. Safety outcomes will include significant arrhythmias, lactic acidosis, and hyperglycemia. This study will be a retrospective cohort study. Adults admitted to the Medical, Surgical, or Neurological ICU at the Cleveland Clinic between August 1, 2010 and August 31, 2016 will be included if they had a diagnosis of septic shock, received norepinephrine prior to initiation of epinephrine, and received epinephrine for at least one hour. Patients will be excluded if norepinephrine and epinephrine were started concomitantly. Classification and regression tree analysis will be conducted to determine the optimal norepinephrine-equivalent dose. Secondary outcomes will be compared between the two cohorts using appropriate inferential statistical tests. **Results/Conclusion:** Results will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Review the Surviving Sepsis Campaign recommendations for the timing of therapy in sepsis

Discuss the literature available on when to add a second vasopressor

Self Assessment Questions:

Which of the following do not fall within the 3 hour sepsis care bundle?

- A: Broad spectrum antibiotics
- B: Vasopressors
- C: 30 ml/kg of crystalloids
- D: Check a lactate level

Which of the following statements regarding vasopressors in septic shock is false?

- A: There is a 20% increase in the risk of death for every hour delay in
- B: Epinephrine, vasopressin, and phenylephrine are all second line o
- C: Vasopressors should be initiated within 6 hours of septic shock pri
- D: There are strong evidence-based recommendations regarding the

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-499L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DEVELOPMENT AND IMPLEMENTATION OF A CLINICAL QUALITY DASHBOARD FOR AMBULATORY PHARMACIST SERVICES

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Purpose: Aurora Health Care is an integrated, not-for-profit health care system with 15 hospitals and 159 clinic sites across eastern Wisconsin. Of these 159 clinic sites, pharmacists provide services at 11 clinic sites. The current metrics being measured in these clinics include pharmacist referrals and visits, pharmacist interventions, changes in clinical endpoints, patient satisfaction, and both direct charges and indirect estimated cost savings. Some of these measures are mainly compiled electronically. However, many of these metrics involve a significant amount of manual chart review or data compilation. This is a time consuming process which decreases the pharmacists efficiency and availability to provide additional clinical services. Additionally, the presentation of these multiple metrics is not consistent between clinics and is primarily through tables. The objective of this project is to develop and implement an automated clinical quality dashboard to assess volume and quality of services provided by ambulatory pharmacists in Aurora Health Care clinics. **Methods:** Select members of pharmacy management were contacted to solicit recommendations for the design and purpose of the automated dashboard for ambulatory pharmacist services. It was decided that the dashboard would be used by internal management to justify clinical pharmacy services in the ambulatory settings and the defined audience was to include pharmacy leadership committees, cabinet meetings, and discussion with hospital administrators. The key components of the dashboard would be volume and quality of clinical services. The information technology (IT) team was engaged in order to identify how to electronically access the key components for development and implementation of the dashboard. **Results/Conclusions:** A visually appealing automated clinical quality dashboard is currently being developed, validated, and implemented and will be presented at the Great Lakes Conference. Several IT related limitations were identified, requiring either workarounds or modifications to the initially planned dashboard.

Learning Objectives:

Describe the benefits of developing and implementing an automated clinical quality dashboard

Identify factors to consider when developing an automated dashboard for ambulatory pharmacist services

Self Assessment Questions:

Which of the following is considered a benefit of developing and implementing an automated clinical quality dashboard?

- A Justify clinical pharmacy services
- B: Decrease pharmacist efficiency
- C: Decrease pharmacist availability to provide additional clinical services
- D: Increase manual chart review and data compilation

Which of the following was a successful method for developing an automated dashboard for ambulatory pharmacist services?

- A Excluding key stakeholders
- B Ignoring feedback
- C Defining dashboard audience
- D Ignoring technology limitations

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-736L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF PHARMACIST PRIVILEGING ON INAPPROPRIATE STRESS ULCER PROPHYLAXIS UPON DISCHARGE FROM THE INTENSIVE CARE UNIT

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Purpose: To determine if pharmacist privileging with status as a non-physician provider will result in decreased rates of inappropriate stress ulcer prophylaxis (SUP) upon discharge from the intensive care unit (ICU). **Methods:** A retrospective study of patients admitted to the surgical (SICU) or medical intensive care units (MICU) at The Ohio State University Wexner Medical Center was performed. Patients admitted to these ICUs in January 2015 were compared to patients admitted to the same ICUs in January 2016 after implementation of a SUP algorithm and pharmacist privileging to discontinue inappropriate SUP as defined by criteria in the algorithm. Patients were included if they received a proton pump inhibitor (PPI) or histamine receptor antagonist (H2RA) during their admission to the ICU. Exclusion criteria were presentation with a gastrointestinal bleed, age less than 18 years, pregnancy, incarceration, death during admission, or discharge to hospice. The primary outcome was the rate of inappropriate continuation of acid suppression therapy when a patient was discharged to home, a skilled facility, or transferred out of the ICU in the pre-group compared with the post-group. **Preliminary Results:** The 203 patients admitted to the ICU in January 2015 were listed in random order and assessed for inclusion until 80 patients were included. The type of SUP during ICU stay was distributed as follows: 52.5% H2RA, 33.8% PPI, and 13.8% both. The pre-group was 56% female with a mean age of 54 (18 to >80 years). Fifty percent of included patients reported taking acid suppression therapy prior to admission, of which 75% reported taking a PPI. Inappropriate continuation of acid suppression therapy occurred in 27.5% of patients without a chronic indication or a continued need for SUP. **Conclusions:** Final analysis of the post-group and conclusions will be presented at the 2017 Great Lakes Pharmacy Conference.

Learning Objectives:

Identify appropriate indications for stress ulcer prophylaxis (SUP) in the intensive care unit (ICU)

Describe the impact of pharmacist intervention on reducing inappropriate SUP upon discharge from the ICU

Self Assessment Questions:

What is an appropriate indication for acid suppression therapy in the ICU?

- A Coagulopathy
- B: Tracheostomy on room air
- C: Nasal cannula
- D: Any type of ICU admission

What is a potential consequence of inappropriate SUP?

- A Fewer drug-drug interactions
- B Increased patient financial burden
- C Decreased healthcare expenditures
- D Decreased rates of Clostridium difficile infection

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-427L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

REDUCING FLUOROQUINOLONE USE THROUGH IMPLEMENTATION OF A URINARY TRACT INFECTION (UTI) TREATMENT PATHWAY AND HEALTHCARE PROVIDER EDUCATION

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Purpose: Fluoroquinolones are associated with significant adverse effects, including tendonitis, tendon rupture, and *Clostridium difficile* infection, especially when used in older adults. Additionally, there is a trend of increasing resistance of *Escherichia coli* and other gram negative organisms to fluoroquinolones. The objective of this study is to decrease the inappropriate use of fluoroquinolones for treatment of urinary tract infections in patients admitted to or seen in the outpatient setting of this institution through implementation of a UTI treatment pathway and targeted provider education. **Methods:** A retrospective chart review was conducted and a query of the electronic medical record was used to identify patients with a diagnosis of UTI who have also been prescribed ciprofloxacin, levofloxacin, or moxifloxacin from January 1, 2016 to October 31, 2016. Data collected included age, gender, ethnicity, comorbidities, allergies to antibiotics, culture data, antibiotic prescribed, diagnosis, days of therapy, and reported adverse events. A letter to healthcare providers focusing on UTI treatment and practicing fluoroquinolone avoidance was disseminated on November 1, 2016, and a new UTI treatment pathway was published in a newsletter sent out to healthcare providers and posted throughout the institution in December 2016. It will be implemented into the electronic medical record system by June of 2017. Post-intervention data will be collected from January 1, 2017 through March 1, 2017. The primary endpoint of the study is prescriptions or orders for fluoroquinolones per patient diagnosed with UTI before and after the interventions. Secondary endpoints include duration of antibiotic therapy compared to guideline recommendations, documentation of adverse events or *Clostridium difficile* infections, and number of diversions from the UTI treatment pathway. Data will be analyzed to determine effectiveness of the interventions in reducing fluoroquinolone use in this health system. **Results/Conclusions:** Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe appropriate UTI prescribing practices for the inpatient and outpatient settings of a community hospital network.

Identify effective ways to reduce the inappropriate use of fluoroquinolones for treatment of urinary tract infections.

Self Assessment Questions:

Which of the following is not an appropriate first-line treatment option for a female patient with an uncomplicated UTI and no known allergies?

- A Bactrim DS 1 tablet BID for 3 days
- B: Cefpodoxime 100 mg BID for 7 days
- C: Nitrofurantoin 100 mg BID x 5 days
- D: Ciprofloxacin 250 mg BID x 7 days

What is the approximate national rate of susceptibility of *E. Coli* to fluoroquinolones?

- A 95%
- B 80%
- C 89%
- D 30%

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-646L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

VALUE OF A CLINICAL PHARMACIST ON MULTI-DISCIPLINARY BEHAVIORAL HEALTH ROUNDS

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Background: The impact of including clinical pharmacists in medical rounding teams has been well-documented for general medicine services. Pharmacists have been shown to make interventions that improve patient safety, decrease adverse drug events, and even reduce overall length of stay when participating in rounds.¹⁻³ The impact of having a pharmacist present on behavioral health rounds has yet to be demonstrated. Behavioral health is a rapidly growing field for pharmacy because many psychiatric medications have complicated pharmacologic properties that are not well understood by other healthcare professionals. Additionally, the provision of proper psychiatric care often involves regimens with multiple medications that require careful dosage adjustments to achieve the optimal effects. **Objectives:** The purpose of this study is to investigate and document the role of the clinical pharmacist in the behavioral health unit, particularly when rounding with a team of psychiatrists. **Methods:** This study will include a retrospective review of the interventions made by pharmacists on behavioral health rounds over a four month period (August to December 2016). Interventions documented during rounds will be reviewed and classified by type, including dose optimization, adverse drug event prevention, and duplicate therapy avoidance. Interventions will be reviewed for acceptance by the physician. The documented interventions will be compared to the interventions documented for that physicians patients from August to December 2015, before clinical pharmacists began participating in behavioral health rounds. The primary outcome of this study will be physician-accepted pharmacist interventions. Secondary outcomes for this study will include cost savings and adverse drug events prevented by pharmacist interventions on rounds. **Results:** Results and conclusion will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the role of a clinical pharmacist in behavioral health rounds.

List three ways in which including the pharmacist on behavioral health rounds benefits patient care.

Self Assessment Questions:

Which of the following are examples of the core responsibilities of Behavioral Health Clinical Pharmacist?

- A Monitoring for potential adverse drug reactions and interactions
- B: Ensuring that all orders are entered in a timely fashion
- C: Working with interprofessional teams to optimize drug therapy
- D: A and C only

Which of the following measures have been positively impacted by clinical pharmacist participation on multi-disciplinary rounds?

- A Incidence of medication errors
- B Patient satisfaction
- C Patient length of stay
- D A and C only

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-750L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ROLE OF PROTON PUMP INHIBITOR AND RECURRENT CLOSTRIDIUM DIFFICILE INFECTION

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C. difficile is a gram-positive, anaerobic, spore-forming rod that causes approximately 50,000 infections and 29,000 deaths annually and has been declared by the CDC as an "urgent threat" to public health. Research has shown that the use of acid suppressive therapy, such as proton pump inhibitors (PPI), is associated with an increased risk of developing CDI. Jump and colleagues hypothesized that the pathogenesis could be due to acid suppression and survival of vegetative form of *C. difficile*. CDI treatment with metronidazole or vancomycin is associated with about 25 percent of recurrence, and subsequent CDI episodes can occur in 40 to 60 percent of patients after a second recurrence. There is, however, limited evidence as to how PPI therapy plays a role in CDI recurrence. This study aims to assess the relationship between PPI and recurrent CDI and examine the impact of PPI exposure on rate of CDI recurrence. Specifically, the impact of PPI therapy will be investigated as a risk factor for recurrent CDI. This retrospective, observational study evaluated the relationship between PPI therapy and recurrent CDI. Adult patients with positive *C. difficile* PCR assay results between July 1, 2012 and June 30, 2016 at Edwards Hines Jr. VA Hospital were identified from the Veterans Affairs Corporate Data Warehouse. Patients were screened for index CDI episode and stratified into PPI-exposure group and non-exposure group. Two groups were further categorized according to CDI recurrence status. Subgroup stratifications were based on severity of illness, age at positive PCR, in-hospital mortality, non-CDI directed antimicrobial exposure, and ICU status. Relevant patient level data were extracted. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference pending data collection and analysis.

Learning Objectives:

Identify risk factors associated with recurrent *Clostridium difficile* infection
Recognize the role of proton pump inhibitor exposure in recurrent *Clostridium difficile* infection

Self Assessment Questions:

Which of the following may be risk factor(s) for recurrent CDI?

- A Concomitant PPI use
- B: Age <30
- C: Receipt of antibiotics (non-CDI treatment)
- D: A and C

What is one proposed mechanism between PPI and recurrent CDI?

- A Acid suppression by PPI leads to survival of vegetative form of *C.*
- B PPI use may disrupt normal flora in the upper and lower GI tract
- C PPI use may increase inflammation, which increases risk of recurr
- D There is currently no hypothesized mechanism

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-923L05-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EFFECT OF PHARMACIST INTERVENTION ON GLYCATED HEMOGLOBIN IN POORLY CONTROLLED DIABETIC PATIENTS AT AN INTERNAL MEDICINE OFFICE

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Purpose: Pharmacists collaborate with physicians to optimize therapy for diabetic patients. The objective of this study is to determine the impact of pharmacist intervention on glycated hemoglobin during internal medicine office visits. **Methods:** Patients with poorly controlled diabetes such as glycated hemoglobin greater or equal to nine will be identified. At minimum, the following data will be collected at baseline before pharmacist intervention: age, gender, glycated hemoglobin, number of diabetes medications, type of diabetes medications, and number of office visits within the previous three months. At minimum, any of the following interventions may be performed during each pharmacist appointment: dose adjustment, medication addition, medication removal, medication counseling, lifestyle counseling, and plan for follow up. Glycated hemoglobin will be measured periodically. Appointment documentation will be reviewed retrospectively and appointment details will be used to complete a standardized intervention form. From these forms, data will be pooled together and assessed. Other data that will be collected if available include number of diabetes medications throughout the study time frame, hospitalization for diabetes related issue, number of appointments with a pharmacist during study time frame, and number of referrals to a specialist regarding diabetes related diagnoses. The impact of pharmacist involvement in diabetes management will be evaluated based on intervention data and effect on glycated hemoglobin. **Results:** Final results and conclusions are pending and will be presented at the 2017 Great Lakes Pharmacy Residency Conference

Learning Objectives:

Identify possible pharmacist interventions during a diabetes appointment
Describe general differences between physician primary care visits and pharmacist diabetes appointments.

Self Assessment Questions:

Which of the following is a possible pharmacist intervention during a diabetes appointment?

- A Diagnose hypertension
- B: Prescribe a drug for weight loss
- C: Optimize insulin therapy
- D: Diagnose diabetic neuropathy

Which of the following is a difference between a physician primary care visit and a pharmacist diabetes appointment?

- A Pharmacist diabetes appointments can be longer in length
- B Pharmacist diabetes appointments cost more
- C Pharmacist diabetes appointments can focus on one disease state
- D A & C

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-486L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

LONG-TERM OUTCOMES OF KIDNEY TRANSPLANT PATIENTS RECEIVING TREATMENT FOR BIOPSY PROVEN VS. EMPIRIC THERAPY FOR REJECTION

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Purpose: To identify long-term effects on graft function and survival when a patient is treated with empiric rejection therapy or biopsy proven rejection treatment, as well as identify the complication rates associated with kidney biopsy and the incidence of complications of empiric therapy such as infection rates. **Methods:** This study is a retrospective chart review of all kidney transplants from 2005 to 2014. The patients will qualify if they have undergone a per cause biopsy or empiric rejection therapy. Multi-organ transplants will be excluded. Once the patient qualifies a full chart review will be completed. The primary outcomes will be the return to baseline serum creatinine and graft loss and complications relating to the biopsy or the empiric therapy. The secondary outcome will be the rates of biopsies needed after receiving empiric rejection therapy due to lack of improvement in kidney function. **Results:** There are a total of 904 kidney transplants that occurred from 2005 to 2014. To date 229 patients have been reviewed for inclusion into the study with 121 of these qualifying. So far there are a total of 75 events of empiric rejection therapy and a total of 150 events of per cause biopsies. Full statistical analysis of the outcomes is underway. **Conclusion:** N/A

Learning Objectives:

Discuss the use of empiric therapy for rejection
Review the markers that are used to evaluate graft function

Self Assessment Questions:

What is the "gold standard" when graft rejection is suspected?

- A Start empiric therapy immediately
- B: Obtain a biopsy and treat the results
- C: Start empiric therapy and then obtain a biopsy
- D: Adjust maintenance immunosuppression

What is the number one marker that is used to evaluate graft function?

- A urine output
- B serum sodium
- C serum creatinine
- D fluid status

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-582L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF AN ELECTRONIC MEDICAL RECORD EMBEDDED ANTIMICROBIAL STEWARDSHIP SCORING TOOL IN A NON-TEACHING COMMUNITY HOSPITAL

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Background: The IDSA/SHEA guidelines on antimicrobial stewardship program development recommend that healthcare institutions invest in data systems that are capable of measuring quality improvement from program implementation. Clinical decision support systems (CDSS) have been shown to improve the function of antimicrobial stewardship programs (ASPs). However, many CDSS are separate from the institution electronic medical record thus requiring the clinician to utilize two systems for ASP review. The challenge becomes CDSS implementation within the confines of institution electronic medical record platforms that results in efficient and actionable items. **Purpose:** To evaluate the actionability of an antimicrobial stewardship scoring tool embedded within a non-teaching community hospitals electronic medical record. **Methods:** A retrospective cohort study assessed the impact of an antimicrobial stewardship scoring tool pre and post institution customization based on assessment of score actionability. Patients located in the intensive care unit and general medicine floors who had an antimicrobial stewardship (AMS) score reported were included in the analysis. The primary outcome is to evaluate the actionability of the score with a target of 80%. Data points collected include AMS score, scoring rules, indication for therapy, antibiotics administered, ordering service, presence or absence of an ID service consult, days of therapy, microbiological data and services that acted upon the score (eg. pharmacist, infectious disease, medicine). **Conclusions:** Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe how clinical decision tools can improve the function of stewardship programs.

Identify strategies to implement and utilize an antimicrobial stewardship scoring tool within the electronic medical record.

Self Assessment Questions:

Clinical decision tools improve antimicrobial stewardship practices by:

- A Alerting clinicians to high acuity patients
- B: Providing recommendations for therapy
- C: Replacing clinical judgement regarding antimicrobial therapy
- D: A and B

Which of the following may aid in implementing an effective antimicrobial stewardship scoring tool?

- A Work with IT staff to create individualized rules within the EMR
- B Identify aspects of the tool that will be actionable to the end user
- C Collect and analyze data pre- and post-implementation of the tool
- D All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-912L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

FOSFOMYCIN VERSUS STANDARD CARE FOR EXTENDED-SPECTRUM BETA-LACTAMASE-PRODUCING PATHOGENS OR PSEUDOMONAS SPP. IN URINARY TRACT INFECTIONS

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Purpose: Multidrug resistant (MDR) pathogens are an increasing problem facing healthcare today. These pathogens can cause serious systemic infections, but can also be seen in less critical infections of the urinary tract. It is important to have viable treatment options for these cases that optimize outcomes with demonstrated efficacy and minimize toxicity, while also upholding principles of antimicrobial stewardship. The objective of this study was to evaluate the outcomes of treatment with fosfomycin as an alternative to other standard agents for treatment of urinary tract infection (UTI) caused by extended-spectrum beta-lactamase (ESBL) producing pathogens or *Pseudomonas* spp. **Methods:** This is a retrospective chart review of adult patients with urinary tract infection (uncomplicated and complicated) caused by ESBL or pseudomonal pathogens. The primary outcome measure is success rate of fosfomycin compared with standard care, with success defined as absence of relapse or reinfection within thirty days of infection. **Results / Conclusion:** Data collection is currently in progress. Results and conclusion will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

List the benefits of fosfomycin for treatment of urinary tract infection
Describe key stewardship considerations for antibiotic selection

Self Assessment Questions:

Which of the following is an advantage of using fosfomycin for treatment of urinary tract infection?

- A Adequate systemic absorption to treat urosepsis
- B Inexpensive
- C Susceptibility data frequently available
- D Broad spectrum but narrow indication

Why is it important to avoid use of carbapenems for non-systemic urinary tract infections whenever possible?

- A Reserve these agents for more serious systemic infections
- B To ensure they continue to not be associated with inducible resistance
- C Their narrow spectrum raises concerns that the pathogen won't be
- D All of the above

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-737L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DEVELOPMENT AND IMPLEMENTATION OF A STANDARDIZED SYSTEM-WIDE STERILE COMPOUNDING TRAINING PROGRAM

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Purpose: With increased scrutiny and focus on sterile compounding training with the release of Chapter 797 and Chapter 800 in the United States Pharmacopeia (USP), sterile compounding facilities are required to develop and implement robust tools, processes and assessments to ensure adequate training of their compounders. The objective of this project was to develop and implement a standardized sterile compounding training program across a multi-hospital health-system that incorporated best practice recommendations and USP Chapters 797 and 800 standards. **Methods:** Baseline data on each sterile compounding facility's training across the system was collected and reviewed. Sterile compounding personnel across the system completed a written sterile compounding knowledge-based assessment and a media-fill challenge test which included an observed assessment of their aseptic technique, utilizing an aseptic technique rubric. The current sterile compounding personnel then completed an online one-hour review of sterile compounding related calculations, a half-hour review of beyond-use dating assignment, and a one-day in person refresher training course which included a review of proper aseptic technique and review of major concepts within USP Chapters 797 and 800. Approximately three to six months after completion of the refresher training course, the sterile compounding personnel completed the same three assessments, which included observed aseptic technique, a media fill challenge test and a written knowledge-based exam. Based on the pre-training data, a standardized, system-wide, training program was developed for all newly hired sterile compounding personnel, incorporating the in-person, live training course, on-line training and hands-on, on-site training with an emphasis on repeated evaluation of performance throughout training rather than length of time. A standardized, system-wide, yearly competency of all current sterile compounding personnel was also developed, as well as a detailed plan for retraining after an unsuccessful result. **Results/Conclusion:** Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize the importance of a standardized, streamlined training program within a large, integrated health care system.

List characteristics of a successful sterile compounding training program

Self Assessment Questions:

What is the significance of a standardized sterile compounding training program within a large, integrated health care system?

- A Spending less time training technicians and pharmacists in the sterile compounding process
- B Spending fewer resources on the proper training and technique of
- C To identify personnel with lesser knowledge and skills and to focus
- D Less variation of staff practices during training of newly hired personnel

What is a characteristic of training that Aurora Health Care incorporated to the new design for sterile compounding training?

- A Time-based training vs. skill-based training
- B Interactive, in-person training courses
- C Single assessment of aseptic skills and techniques
- D Online, independent training only so personnel can begin compounding

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-719L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PROTOCOL GUIDED AMBULATORY ALCOHOL DETOXIFICATION AT THE BATTLE CREEK VETERANS AFFAIRS MEDICAL CENTER: A QUALITY IMPROVEMENT INITIATIVE

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Purpose: Alcohol is the most common substance of abuse that leads Veterans to be admitted for substance use treatment. The majority of patients with alcohol use disorders are identified in the primary care setting. Even though ambulatory alcohol detoxification (detox) has an established place in clinical care, it is consistently underutilized. This project will evaluate current practices and policies related to the ambulatory management of alcohol detox in the Veteran population within the Battle Creek Veterans Affairs Medical Center to develop and implement a policy detailing an evidence-based ambulatory alcohol detox protocol to improve Veteran care and facility outcomes.

Methods: Veterans who have received ambulatory alcohol detox treatment per current local guidance will be identified. This will be completed via a database search for relevant notes entered in Veteran electronic medical records, from the date of initiation of the current protocol and until the date of initiation of the updated protocol. Protocol adherence will be assessed by reviewing identified Veteran records for appropriate use of protocol defined notes and orders. The facility's current ambulatory alcohol detox protocol will be compared to clinical practice guidelines and national directives. An updated, evidence-based protocol for ambulatory alcohol detox will be developed. Clinical staff will be educated on the newly developed ambulatory alcohol detox protocol. Effectiveness of this initiative and adherence to the updated protocol will be assessed by reviewing related Veteran records for appropriate use of protocol defined notes and orders. Pre- and post-implementation adherence to ambulatory alcohol detox protocols will be compared using descriptive statistics. Based on the results of this comparison a continuous quality improvement plan will be proposed to ensure the sustained clinical relevancy and optimal utilization of the updated protocol.

Learning Objectives:

Identify if a patient is appropriate for ambulatory alcohol detoxification.
Recognize appropriate therapeutic options for ambulatory alcohol detoxification.

Self Assessment Questions:

Which of the following would exclude a patient from ambulatory alcohol detoxification?

- A: CIWA-AR score 10 – 19
- B: Inability to tolerate oral medication
- C: BP 160/100 mmHg
- D: Any history of previous alcohol withdrawal

Which of the following is a recommended therapeutic option for ambulatory alcohol detoxification?

- A: Topiramate
- B: Lamotrigine
- C: Divalproex
- D: Phenytoin

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-479L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EFFECTS OF EXTENDED-INFUSION VERSUS TRADITIONAL INFUSION OF CEFEPIME, CEFTAZIDIME, DORIPENEM AND MEROPENEM ON CLINICAL OUTCOMES

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Purpose: Beta-lactam antibiotics are a class of antibiotics that include penicillins, cephalosporins and carbapenems, all of which contain a beta lactam ring in their molecular structures. Beta-lactams are time-dependent in their antimicrobial activity, with bactericidal effects correlating with time above the minimum inhibitory concentration (T>MIC). The goal T> MIC for carbapenems and cephalosporins is 20-40% and 50-70% of the dosing interval, respectively.

Pharmacodynamic/pharmacokinetic data suggest a benefit; however there are a limited number of retrospective studies comparing extended infusion (EI) to traditional infusion (TI) dosing. These small studies found a shorter ICU stay and increased microbiologic success in the EI dosing group. One study also noted a lower mortality in patients with *Pseudomonas aeruginosa* infections. Given this data, our facility implemented an EI dosing protocol for cefepime, ceftazidime, doripenem and meropenem on September 25, 2012.

Methods: This is a retrospective analysis of all Veterans at the JBVAMC who received cefepime, ceftazidime, doripenem, or meropenem between August 31, 2006 and July 1, 2016. Subjects will be identified using electronic prescription report and appropriately placed into either the TI or EI group based on the infusion time of the antimicrobial agent. Data will be collected to determine if a difference exists in the length of hospital stay, as well as to assess 14- and 30-day mortality between groups.

Results/Conclusion: Collection and analysis of the data is ongoing. Results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Explain the rationale for extending the infusion time of beta-lactam antibiotics.

Identify the antimicrobials in which their bactericidal capability is dependent on their time above the MIC.

Self Assessment Questions:

What is the rationale for extending the infusion time of beta-lactam antimicrobials?

- A: There are less medication interactions if you extend the infusion time
- B: Beta-lactams are peak to MIC dependent, thus extending the infusion
- C: Beta-lactams are time > MIC dependent, thus extending the infusion
- D: Extending the infusion of beta-lactam agents results in shorter duration

2. Which of the following antimicrobials is NOT dependent on the time above the MIC for its bactericidal activity?

- A: Meropenem
- B: Cefepime
- C: Levofloxacin
- D: Ceftazidime

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

WARFARIN MANAGEMENT IN PATIENTS WITH CANCER RECEIVING CHEMOTHERAPY

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Purpose: Patients with cancer are at an increased risk of thrombotic events and warfarin therapy may decrease this risk. Chemotherapy can increase or decrease the anticoagulant effects of warfarin, depending on the specific chemotherapy treatment. Despite these effects on warfarin, current warfarin dosing and international normalized ratio (INR) lab management guidelines do not exist for patients with cancer on specific chemotherapy treatment. The objective of this study is to determine if this institution's Anticoagulation Service (ACS) is effectively reaching desired anticoagulation for patients with cancer on warfarin who are receiving chemotherapy. **Methods:** This is an Institutional Review Board approved retrospective cohort study including patients 18 years and older treated with chemotherapy for a cancer diagnosis managed on warfarin by this institution's ACS between May 2016 and November 2016. Data being gathered electronically from subject medical records includes type of cancer and date of cancer diagnosis, date of chemotherapy treatment, name of chemotherapy, and major bleeding or thrombotic events (list noninclusive). Manual chart review will be performed to gather further information. Subjects with a goal INR less than two are excluded. Data will be assessed in three subject groups: 1) patients with cancer taking warfarin who are receiving chemotherapy treatment, 2) patients with cancer taking warfarin who are not receiving chemotherapy treatment, 3) patients without cancer taking warfarin who are not receiving chemotherapy treatment. Statistical analysis will be conducted to determine if differences exist between the three subject groups regarding subjects INR time in therapeutic range and major bleeding or thrombotic events. These results will be used to determine appropriate warfarin dosing and frequency of INR lab draws for patients with cancer receiving chemotherapy. **Results/Conclusions:** Data collection is currently in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

List the mechanisms in which cancer and chemotherapy can affect clotting and bleeding risk for patients taking warfarin.

Name the common enzymes by which warfarin is metabolized.

Self Assessment Questions:

Which of the following statements is true about warfarin management?

- A Dehydration from chemotherapy induced nausea, vomiting, and diarrhea
- B: Genetic mutations do not influence warfarin's therapeutic effect.
- C: Select chemotherapy and other medications altering warfarin metabolism
- D: Chemotherapy induced nausea and vomiting leading to a change in INR

Which of the following enzymes primarily metabolizes the S isomer of warfarin?

- A Cyp1a2
- B Cyp2c9
- C Cyp2c19
- D Cyp3a4

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-369L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

HORSIES AND BUNNIES: A COMPARISON OF ANTITHYMOCYTE GLOBULIN IN ALLOGENEIC STEM CELL TRANSPLANT

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Purpose: Graft versus host disease (GVHD) is a major complication of allogeneic hematopoietic stem cell transplant (HSCT). In vivo T-cell depletion with antithymocyte globulin (ATG) decreases the incidence of GVHD in HSCT recipients. Antilymphocyte agents such as Atgam or Thymoglobulin are used in combination with a calcineurin inhibitor and low dose methotrexate to decrease the incidence, severity and treatment refractoriness of chronic GVHD. In 2011, the Bone Marrow Transplant (BMT) group at Henry Ford Hospital in Detroit, Michigan started utilizing Thymoglobulin in place of Atgam due to its ease of administration and decreased incidence of infusion-related reactions.

The primary endpoint is the incidence of chronic GVHD with either ATG product. Secondary endpoints include: incidence of acute GVHD, cumulative incidence of CMV reactivation, average length of stay, incidence of hypersensitivity reactions, and overall incidence of infection. The goal of this study is to describe the overall impact of transitioning from Atgam to Thymoglobulin at Henry Ford Hospital.

Methods: This is a retrospective non-inferiority study to evaluate the clinical outcomes of unrelated HSCT patients who received ATG. Patients meeting inclusion criteria from January 2005 to December 2015 will be screened from the electronic medical record. Inclusion criteria include: adults greater than 18 years old who received an allogeneic unrelated HSCT (peripheral or bone marrow) with Atgam or Thymoglobulin as part of GVHD prophylaxis. Statistical analyses will be performed using IBM SPSS. For bivariate analyses, nominal variables will be compared using the Pearson's Chi-Square or Fisher's exact test. Continuous variables will be compared using Student's t-test or Mann-Whitney U-test. Adverse events will be described in the safety population of patients who receive at least one dose of ATG.

Learning Objectives:

Describe chronic graft versus host disease (GVHD) and explain the differences between acute and chronic GVHD

Explain the various methods used to prevent chronic GVHD including in vivo T-cell depletion with antithymocyte globulin

Self Assessment Questions:

Chronic GVHD is more common in what type of stem cell transplant recipients and when does it occur?

- A Autologous stem cell transplant, greater than 100 days after transplant
- B: Allogeneic related and unrelated stem cell transplant, greater than 100 days after transplant
- C: Autologous stem cell transplant, less than 100 days after transplant
- D: Allogeneic related and unrelated stem cell transplant, less than 100 days after transplant

What combination of immune suppressive therapies are administered along with antithymoglobulin (ATG) to decrease the incidence and severity of chronic GVHD in allogeneic stem cell transplants?

- A Tacrolimus, low dose methotrexate, ATG
- B Tacrolimus, mycophenolate mofetil, ATG
- C Tacrolimus, methylprednisolone, ATG
- D Mycophenolate mofetil, methylprednisolone, ATG

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-429L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF CHRONIC PROTON PUMP INHIBITOR (PPI) THERAPY IN THE MONROE CLINIC POPULATION

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Purpose: Proton pump inhibitors (PPIs) are some of the most commonly used medications in the United States. Many patients are on chronic PPI therapy, defined as greater than 8 weeks, when they need not be. Recent literature suggests that chronic PPI usage is associated with a multitude of adverse outcomes, such as iron deficiency, vitamin B12 deficiency, magnesium deficiency, and increased rates of fractures, pneumonia, clostridium difficile infections, and dementia. This study aims to quantify the percentage of patients at Monroe Clinic who are appropriately or inappropriately on chronic PPI therapy. In addition, we will also look at the rates of associated adverse outcomes in this patient population. **Methods:** The electronic medical record system was used to identify adult patients who are taking PPIs chronically. The following data were collected: medical record number, age, gender, PPI type and dose, duration of use, indication for use, presence of kidney failure, vitamin B12 deficiency, magnesium deficiency, iron deficiency, any mention of fractures or pneumonia, diagnosis of dementia, or diarrhea attributed to clostridium difficile. Chart review was completed for patients on chronic PPI therapy and therapy was determined as appropriate, possibly appropriate or inappropriate based on predefined criteria. Analysis was conducted to determine the rates of appropriate chronic PPI usage in patients at Monroe Clinic and the rates of associated adverse outcomes. **Results and Conclusions:** Data and analysis pending and will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize a patient is appropriately on chronic proton pump inhibitor therapy.

Identify the adverse outcomes associated with long term proton pump inhibitor usage.

Self Assessment Questions:

Which of the following is an appropriate indication for chronic proton pump inhibitor therapy?

- A: Barrett's esophagus
- B: Gastroesophageal reflux disease
- C: Helicobacter pylori positive ulcer
- D: Prior ulcer within the past year

Chronic proton pump inhibitor therapy has recently been associated with

- A: Constipation
- B: Hypokalemia
- C: Magnesium deficiency
- D: Urinary tract infections

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-776L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF ADHERENCE AND EFFICACY OF HEPATITIS C VIRUS (HCV) DRUG TREATMENT IN PATIENTS THAT USE INTRAVENOUS DRUGS

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Purpose: Newer therapies for HCV are more effective and better tolerated compared to peginterferon and ribavirin. Current HCV guidelines recommend treating all patients with a history of intravenous drug abuse (IVDA). However, many payers are reluctant to pay for HCV therapy in such patients. In studies of HCV treatments containing peginterferon and ribavirin, adherence and efficacy rates did not differ significantly between patients who used injection drugs and patients who did not. The purpose of this study is to determine whether adherence to current HCV treatment differs between patients with a history of IVDA compared to patients without a history of IVDA. **Methods:** This is a retrospective cohort study comparing patients with a history of IVDA to patients without this history. Patients who completed HCV treatment with a direct acting agent regimen at the University of Michigan Health System between September 1, 2015 to September 30, 2016 will be included. Patients with HIV co-infection or liver transplantation will be excluded. The following data will be collected: patient age, gender, ethnicity, HCV medication used, treatment duration, medication refill dates, and sustained virological response (SVR) rate. Among patients with a history of IVDA, IVDA treatment used will be collected. The primary endpoint will be HCV treatment adherence defined as proportion of days covered (PDC). The secondary endpoint will be treatment effectiveness defined as SVR. Among patients with a history of IVDA, the comparator groups of patients who did or did not receive addiction treatment will be examined as a subgroup analysis. **Results/Conclusions:** Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference

Learning Objectives:

Review hepatitis C viral (HCV) infection treatment advances and current goals and strategies for therapy in intravenous drug abusers (IVDAs).

Explain the impact on treatment adherence and outcomes in IVDAs receiving HCV treatment with direct acting antiviral therapy.

Self Assessment Questions:

In terms of both efficacy and safety, how do direct-acting Hepatitis C antiviral medications compare to interferon based treatment regimens?

- A: Direct-acting antivirals have less efficacy but a more favorable safety profile
- B: Direct-acting antivirals have greater efficacy but a less favorable safety profile
- C: Direct-acting antivirals have less efficacy and a less favorable safety profile
- D: Direct-acting antivirals have greater efficacy and a more favorable safety profile

For interferon based treatment regimens, how did the treatment adherence and treatment outcomes of intravenous drug abusers compare to the general population?

- A: Intravenous drug abusers had worse treatment adherence compared to the general population
- B: Both intravenous drug abusers and the general population had similar treatment adherence
- C: Intravenous drug abusers had less successful treatment outcomes compared to the general population
- D: Intravenous drug abusers had worse treatment adherence and less successful treatment outcomes compared to the general population

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-443L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

COMPARISON OF INTRAVENOUS MAGNESIUM SULFATE AND ORAL MAGNESIUM L-LACTATE IN ADULT HOSPITALIZED PATIENTS

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Purpose: Magnesium supplementation occurs frequently in the inpatient setting although there are currently no clearly defined guidelines for proper dosing and whether to administer it orally or intravenously. The purpose of this study was to calculate the increase in serum magnesium level following supplementation with either oral or intravenous magnesium in order to compare effectiveness between the two routes of administration. **Methods:** This retrospective study utilized the electronic medical record to identify occurrences between January 1st, 2013 and December 31st, 2015 when patients under hospitalist care received magnesium supplementation with either intravenous magnesium sulfate or oral magnesium L-lactate. Baseline serum magnesium levels were obtained within 12 hours prior to supplementation. Follow-up levels were obtained at least 6 hours after supplementation but within 24 hours of the baseline level. Exclusion criteria included: age <18 years old, estimated creatinine clearance <30mL/min, use of magnesium supplements prior to admission, and administration of both intravenous and oral magnesium within same 24 hour period. Average increase in serum magnesium was calculated and compared between the different administration routes and doses. **Results:** Out of 3332 patients in the stated time frame that met inclusion and exclusion criteria, approximately 90% received intravenous magnesium sulfate. Depending on the dose given, oral supplementation resulted in serum magnesium increases of 0.1-0.2 mg/dL whereas intravenous magnesium increased serum magnesium by 0.3-0.7 mg/dL. **Conclusions:** Hospitalists at our institution currently rely heavily on intravenous magnesium sulfate for supplementation. It is possible that oral magnesium is being ordered at too low of doses for it to have a more significant impact on serum magnesium levels. Results and conclusions will be expanded upon at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify signs and symptoms of hypomagnesemia
Describe potential benefits for each route of magnesium

Self Assessment Questions:

Which of the following could be potentially life-threatening signs/symptoms of hypomagnesemia?

- A: Patient complains to nurse about muscle cramps.
- B: Serum potassium level of 3.7mmol/L that did not increase after po
- C: Patient arrives in ED complaining of 3 days of liquid diarrhea
- D: Patient complains to PCP about chest pain, dizziness, and palpita

Which of the following is a potential benefit of IV magnesium supplementation?

- A: The patient will be able to continue therapy at home.
- B: Serum magnesium levels will increase to a greater extent.
- C: Therapy will be more cost effective.
- D: Up to half of the supplemented magnesium may be excreted in the

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-347L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ASSESSMENT OF THE SAFETY AND EFFICACY OF AN INPATIENT PHARMACIST MANAGED WARFARIN DOSING PROTOCOL

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Purpose: Implementing a pilot pharmacy warfarin dosing service at our hospital will provide valuable information as to the feasibility of a full scale implementation of a service in the future. This dosing service trial will allow pharmacy management to assess if a full scale version would 1) be physically feasible with the current resources, 2) result in improved efficacy and safety outcomes for the patient, and 3) result in cost savings for the hospital through pharmacy management of a high risk medication. **Methods:** A pharmacy managed warfarin dosing protocol has been created and approved by the Pharmacy, Therapeutics, and Nutrition committee which establishes the warfarin dosing guideline for the pharmacists. Patients who are referred to the warfarin dosing service will be assessed for inclusion into one of two treatment populations: new start warfarin therapy or maintenance warfarin therapy. Case matching will be utilized in order to collect data from patients that previously had their warfarin managed by a physician before the initiation of the dosing service trial. This will allow comparison of outcomes between pharmacist managed and physician managed warfarin therapy. The primary efficacy objectives for the new start warfarin group include time to therapeutic INR and percent time in goal INR range. The primary objective for the maintenance warfarin group is percent time in goal INR range. Secondary objectives include length of stay, readmission within 30 days number of supratherapeutic INRs greater than or equal to 4, number of supratherapeutic INRs greater than or equal to 4 requiring reversal, and number of bleeding events requiring discontinuation of warfarin. **Results & Conclusions:** Data collection is still ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize the patient populations in which warfarin is the only indicated oral anticoagulant
Explain the factors which result in increased warfarin sensitivity for a patient

Self Assessment Questions:

Warfarin is the only approved oral anticoagulant in which of the following conditions:

- A: Treatment for pulmonary embolism
- B: Thromboprophylaxis for mechanical heart valve
- C: Prevention of cardioembolic stroke in atrial fibrillation
- D: Prophylaxis for deep vein thrombosis post hip surgery

Which of the following is associated with an increased INR response to warfarin:

- A: Renal insufficiency
- B: Caucasian race
- C: Hyperalbuminemia
- D: Liver dysfunction

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-386L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

THE SAFETY AND EFFICACY OF HIGH-DOSE INTRAVENOUS LABETALOL

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Purpose: Intravenous (IV) labetalol is a common medication used in the inpatient setting for the management of hypertensive crisis and is titrated to effect. The IV labetalol package insert suggests a maximum daily dose of 300 mg despite the widespread use of much higher daily doses in hypertensive emergencies. Multiple studies have looked at patients that received more than 300 mg of IV labetalol per day but none specifically looked at safety outcomes. The only literature available on the safety of this practice are case reports. This will be the first study of its kind to assess the safety and efficacy of this practice. **Methods:** This study is a retrospective, multi-center study that included 28 hospitals. Patients were identified using the electronic medical record and were eligible for the study if they received at least 300 mg of IV labetalol within a 24 hour period. Obstetrics patients were excluded as well as patients who have received certain other anti-hypertensive prior to or during the labetalol infusion. Once patients received 300 mg of IV labetalol, they were then followed for 24 more hours to ascertain the occurrence of study outcomes. The primary outcome examined the incidence of hypotension or bradycardia. Secondary outcomes evaluated the incidence of hypotension and bradycardia individually, the time to reach blood pressure goal, presence of symptomatic bradycardia or use of rescue agents, and the effects on length of stay or mortality. **A** Multivariate Cox proportional hazards model was used to model the association between additional doses of IV labetalol beyond 300 mg and the time to events. **Results/Conclusions:** Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize a typical dosing rate for continuous infusion labetalol
Identify the main dose limiting side effects of intravenous labetalol

Self Assessment Questions:

JH is a 72 year old male who presents with subdural hematoma after a fall and is started on a labetalol continuous infusion with a goal systolic blood pressure of less than 160 mmHg. His most recent blood pressure is 150/90 mmHg.

- A 2 mg/min
- B 10 mg/min
- C 300 mg/day
- D JH is not a candidate for a labetalol infusion

What are the two main side effects of IV labetalol that tend to warrant treatment change (i.e. decreasing the dose or choosing a different drug)?

- A Fatigue and somnolence
- B Hypernatremia and nausea
- C Hypotension and bradycardia
- D Hypokalemia and rebound hypertension

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-640L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF PHARMACIST IMPACT ON ANTIPSYCHOTIC AND BENZODIAZEPINE UTILIZATION IN VETERANS WITH DEMENTIA

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Purpose: It has been established that use of antipsychotics (APs) and benzodiazepines (BZDs) in the elderly population, particularly those with dementia, is associated with increased incidence of adverse effects including sedation, falls, and cognitive impairment. The Veterans Health Administration introduced the Psychotropic Drug Safety Initiative (PDSI) to improve evidence-based psychotropic drug prescribing for Veterans with mental illness. The purpose of this project is to assess the impact of pharmacist recommendations on AP and BZD utilization in Veterans with dementia identified by the PDSI. **Methods:** This retrospective review was conducted at the Robley Rex Veterans Affairs Medical Center in Louisville, Kentucky. All Veterans identified as actionable by the PDSI dashboard for the relevant measures on September 22, 2016 were eligible for selection. Data was obtained from the PDSI dashboard and electronic medical record. Following data collection, a templated note was documented in the electronic medical record to include past medication trials, therapeutic alternatives to AP and/or BZD therapy, and other relevant recommendations. The provider was electronically alerted to review the note. Follow-up was performed via chart review 90 days after the entry date of each note. Provider responses were collected such as a plan to taper, discontinue, or discuss risks of the AP and/or BZD agent. Percent change was evaluated over a 90 day time period.

Results/Conclusions: The project is currently ongoing.

Learning Objectives:

Discuss agents that can be utilized to manage insomnia, PTSD and behavioral symptoms in place of antipsychotics among individuals with dementia.

Identify potential alternatives to benzodiazepines among individuals with dementia.

Self Assessment Questions:

1. Which of the following is an appropriate alternative to an antipsychotic agent for the management of behavioral symptoms of dementia?

- A Lorazepam
- B Citalopram
- C Prazosin
- D Melatonin

2. Which of the following is an appropriate alternative to a benzodiazepine for management of insomnia in a patient with dementia?

- A Quetiapine
- B Buspirone
- C Fluoxetine
- D Trazodone

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-890L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
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EVALUATION OF A STANDARDIZED VANCOMYCIN DOSING STRATEGY IN REACHING DESIRED TROUGH LEVELS

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Background: Vancomycin is an extensively used, widely studied antimicrobial agent. Multiple studies have demonstrated efficacy of dosing strategies as well as appropriateness of therapeutic drug monitoring with vancomycin use. According to the Infectious Disease Society of America, vancomycin should be dosed at 15-20 mg/kg every 8-12 hours, in patients with normal renal function, to achieve target trough levels between 10-20 mg/dL. This recommendation calls for patient-specific regimens to optimize AUC/MIC concentrations while avoiding supratherapeutic, potentially toxic, drug levels. Historically, dosing at Northwestern Memorial Hospital used 1g and 2g doses, with variability allowed in dosing interval (ex. every 18 hours) to achieve equivalent daily mg/kg doses. Several instances of supratherapeutic vancomycin levels resulting in nephrotoxicity occurred using this dosing scheme. In an effort to more adequately reflect guideline-recommended weight-based dosing, an additional 1.5 gram dose was made available for use. **Purpose:** The objective of this study is to evaluate how implementation of an additional vancomycin dose impacts the achievement of goal troughs. **Methods:** This will be a retrospective, pre-post cohort study of adults having received at least four doses of intravenous vancomycin with a respective trough level. The control group will consist of patients receiving the original dosing scheme of 1 or 2 grams. The experimental group will consist of patients receiving the expanded dosing scheme. Patients with altered volumes of distributions (paraplegics, quadriplegics, pregnant women) and patients requiring renal replacement therapy will be excluded. Troughs taken within 60 minutes of next dose will be utilized. For troughs drawn outside this window, population kinetics will be used to determine true trough. **Primary outcome** will be the rate of achieving a therapeutic trough level in the range of 10-20 mg/dL. **Secondary outcomes** will be rates of sub- or supratherapeutic troughs and vancomycin-induced nephrotoxicity, as defined by the IDSA. **Results/Conclusions:** Will be presented at Great Lakes Pharmacy Conference

Learning Objectives:

Review appropriate vancomycin dosing and therapeutic drug monitoring as recommended by the IDSA.

Define vancomycin-induced nephrotoxicity and discuss risk factors for its development.

Self Assessment Questions:

Which of the following is the weight-based dosing recommended by the IDSA for vancomycin use?

- A: 5 mg/kg
- B: 10 mg/kg
- C: 15 mg/kg
- D: 20 mg/kg

Daily cumulative doses above what are associated with an increased risk of vancomycin-induced nephrotoxicity?

- A: 3 grams
- B: 4 grams
- C: 4.5 grams
- D: 5 grams

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-593L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

RISK OF PANCREATITIS IN HYPERTRIGLYCERIDEMIC VETERANS WITH FIBRATE USE

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Purpose: Fibrates are often recommended to patients with hypertriglyceridemia due to their 30-50% triglyceride lowering effect and potential prophylactic effect on reducing pancreatitis. However, one meta-analysis from 2008 showed a possible association between fibrate therapy and increased risk of pancreatitis. The purpose of this quality improvement project is to determine whether the use of fibrates affects the incidence of pancreatitis in hypertriglyceridemic Veterans within VA Illiana Health Care System (VAIHCS). **Methods:** The presence or absence of acute pancreatitis was as the primary endpoint. The secondary outcome was a composite of atherosclerotic cardiovascular disease (ASCVD) events including acute coronary syndromes, myocardial infarction, stable or unstable angina, coronary or other arterial revascularization, stroke, transient ischemic attack, or peripheral arterial disease presumed to be of atherosclerotic origin. Patients were considered for inclusion in this project if they were managed by a primary care provider through VAIHCS and meet the following criteria: age 18 or older and had high a triglyceride lab value greater than 500 mg/dl between 2011 and 2014. **Results:** A total of 824 patients were enrolled for screening. Out of these individuals, 443 patients were assigned to the fibrate group and 381 patients were assigned to the comparator group. Pancreatitis was reported in 3% of the fibrate group and 1.5% of the comparator group. **Conclusions:** Among VAIHCS patients with triglyceride greater than 500 mg/dl, a positive correlation between fibrate use and the risk of pancreatitis was observed. In this sense, providers should consider reevaluating the safety of fibrates and implement changes to minimize inappropriate prescribing of fibrates in the primary care setting. There are potential limitations of the quality improvement project. However, the results appear to support existing literature on this relatively unknown association. Future research is needed to address this concern.

Learning Objectives:

Identify if the use of fibrates is associated with an increased risk of pancreatitis in hypertriglyceridemic Veterans within VAIHCS

Identify if the use of fibrates is associated with an increased or decreased risk of ASCVD in hypertriglyceridemic Veterans within VAIHCS

Self Assessment Questions:

What is one of the reasons why providers often prescribe fibrates?

- A: 30-50% triglyceride lowering effect and potential prophylactic effect
- B: Decrease risk of myopathy and rhabdomyolysis
- C: Reduce the risk of gallstones
- D: All of the above

Which comorbidity was underrepresented in this project, which may increase the risk of developing pancreatitis?

- A: Gallstone
- B: Diabetes mellitus
- C: Renal failure
- D: Liver impairment

Q1 Answer: A Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-703L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

COMPARISON OF PATIENT-REPORTED HOME OPIOID MEDICATIONS USE AND OPIOID PRESCRIPTIONS VERIFIED THROUGH A PRESCRIPTION DRUG MONITORING DATABASE AT A COMMUNITY HOSPITAL

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Purpose: According to the CDC deaths from prescription opioid overdose have quadrupled since 1999. Prescription drug monitoring programs (PDMP) present an opportunity to track controlled medications through an electronic database. In light of the opioid overdose epidemic, pharmacy staff sought to evaluate the routine review of the PDMP during the medication verification process for continued home opioid medications. Ideally, this could ensure a more accurate admission medication list and guide appropriate inpatient medication therapy.

Methods: The electronic medical record will provide data on patients admitted from May 2016 to September 2016. Adult patients from all floors of the hospital will be included if an opioid is re-ordered from the home medication list. Patients will be excluded if medication reconciliation isn't completed or a home medication list isn't collected. Pharmacist education on PDMP use prior to verification of reordered home opioid medications will be provided in January 2017. Implementation of pharmacist checking, documentation of findings, and physician communication of the PDMP report prior to verification of home opioid medications will take place in February 2017. Data will be collected after implementation from February to April 2017. The following information will be collected: number of opioids reordered from the home medication list, number of opioid discrepancies, types of opioid discrepancies, number of opioid fabrications, number of opioid omissions, number of physicians/pharmacies utilized by the patient, whether or not information obtained from the PDMP altered inpatient admission orders, whether or not a drug screen was collected, and whether or not drug screen was positive for opioids. All data will be recorded without patient identifiers. The study has been approved as a quality assurance measure through the hospital's Institutional Review Board. **Results and Conclusions:** Data collection and analysis is ongoing. Results will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize the inclusion and exclusion criteria of the study.
Identify the opportunity presented by the prescription drug monitoring program (PDMP) in the United States current opioid overdose epidemic.

Self Assessment Questions:

A patient will be excluded from the study if:

- A The patient is seen and discharged from the hospital's emergency
- B: The patient is greater than 18 years old
- C: The patient has a re-ordered synthetic opioid from his or her home
- D: The patient has a positive urine screen for opioids

The implementation of a prescription drug monitoring program (PDMP) has been shown to reduce:

- A The number of opioid overdose deaths
- B The number of fake opioid prescriptions
- C The amount of opioid abusers
- D The number of controlled substance prescriptions

Q1 Answer: A Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-965L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

QUALITY IMPROVEMENT PROJECT: DEVELOPING AND ASSESSING A CLINICAL PHARMACY PRODUCTIVITY MODEL

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Purpose: Pharmacy has transitioned from being primarily a distribution-based industry to a clinical service-based practice. Capturing this service-based clinical productivity can be difficult due to the lack of well-defined and standardized metrics. External benchmarking is useful for comparing clinical staffing against other similar organizations, however it lacks ongoing utility for daily internal pharmacy clinical productivity monitoring. At OhioHealth there is a need to establish internal clinical productivity metrics in order to capture and quantify pharmacy clinical services. The primary objective of this project is to assess the correlation of the new clinical pharmacy productivity model with OhioHealth's existing productivity method for pharmacy services. The correlation with other known and generally accepted pharmacy productivity standards will also be assessed. **Methods:** This is an IRB exempt study. Clinical productivity will be calculated via weighted active orders within the Electronic Health Record (EHR) captured on a 24-hour basis. Weighted active orders will be defined as medication orders, navigators (i.e. EHR documentation of pharmacist participation in code blue response, trauma response, stroke alerts, sepsis alerts, and STEM alerts), and pharmacy consults that are associated with a specific medication (e.g. vancomycin, aminoglycosides) that are active on the EHR at the time of data capture. Orders will be categorized and weighted based on clinical acuity supported by literature, hospital policy, guidelines, and expert opinion. In order to calculate clinical productivity, productive pharmacist full time equivalents (FTEs) and weighted active orders will be measured in aggregate per pay period(s), and divided to yield a productivity factor. This new clinical pharmacy productivity will be compared to the current productivity metric as well as other generally accepted pharmacy productivity methods using the Pearson correlation coefficient. **Results:** Data collection and analysis is currently in progress. Results and conclusions will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain the importance of quantifying pharmacy clinical productivity
Outline methods for calculating clinical productivity

Self Assessment Questions:

Which of the following is true regarding pharmacist clinical productivity?

- A There are well-defined and standardized metrics for measuring clinical productivity
- B: External benchmarks can be used daily to measure and track internal productivity
- C: Clinical productivity metrics are needed due to the transition from distribution-based to service-based pharmacy
- D: Clinical productivity metrics are needed due to the transition from inpatient to ambulatory care

Which of the following are components of weighted active orders included in the proposed pharmacy clinical productivity model?

- A Active orders not reviewed by a pharmacist
- B Completed medication orders
- C Number of medication dispenses
- D Active medication orders

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-910L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

OPTIMIZATION AND IMPACT OF A PHARMACY CONCIERGE SERVICE IN A COMMUNITY HOSPITAL

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Purpose: Transitions of care upon discharge is an opportunity for pharmacists to perform medication therapy management, prescription consultation, and offer the Pharmacy Concierge Service- providing the patient convenience of leaving the hospital with their prescriptions in-hand. The Pharmacy Concierge Service was implemented at Community Hospital in 2014 and appears to be underutilized. This study aims to initiate and evaluate a plan to optimize use of the Pharmacy Concierge Service. **Methods:** The current state of the program, including percentage of enrollment to discharge home and number of prescriptions filled per hospital floor unit, were evaluated as a baseline. Education to nursing, case management, and pharmacy staff was provided emphasizing the benefits of the service. The primary endpoints were the percentage of patients discharged home enrolled in the concierge service, number of prescriptions filled from enrolled patients, gross revenue and net revenue of the service. A report was created with Data Analytics to compare Hospital Consumer Assessment of Healthcare Providers and System (HCAHPS) scores for medication-related questions. Secondary endpoints include a comparison of medication-related HCAHP scores to assess satisfaction of patients receiving the service to those who did not, and 30-day readmission to Community Hospital. Data from the outpatient retail pharmacy were collected and evaluated, per hospital unit, to assess the capture rate pre- and post- implementation. Patients were included if they were discharged home from Community Hospital and received prescription delivery prior to discharge. **Results (preliminary):** The number of scripts increased 20.3% in the first quarter following baseline. In the second quarter following implementation, the number of scripts delivered increased 4.7% from the previous quarter and 26.1% from baseline. **Conclusion:** Preliminary results demonstrate improvements in the utilization of the medication bedside delivery service, especially hospital units with a decentralized pharmacist. Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the benefits of a Pharmacy Concierge Service for a healthcare organization.

Identify strategies pharmacists and various departments involved in patient care can utilize to enroll eligible patients into a medication bedside delivery service.

Self Assessment Questions:

How can pharmacists impact transitions of care?

- A Reduce medication discrepancies
- B: Decrease patient satisfaction
- C: Decrease medication adherence
- D: Increase preventable medication-related adverse events

Which of the following strategies can the patients healthcare team implement to enroll eligible patients into a medication bedside delivery service?

- A Avoid the involvement of the decentralized pharmacist
- B Ask the patient if they are interested after the discharge medication
- C Ask the patient if they are interested as early as possible to ensure
- D Ensure the enrollment of patients is the responsibility of only the n

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-789L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EFFECT OF FLUOXETINE ON MOTOR RECOVERY AFTER ACUTE ISCHEMIC STROKE

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Purpose: Stroke is one of the leading causes of disability worldwide, with two-thirds of surviving patients left with persistent motor deficits. Physiotherapy has been shown to reduce functional deficits, but additional strategies are needed to improve outcomes and promote restoration of patients normal pre-stroke function. Multiple small studies have shown selective serotonin reuptake inhibitors (SSRIs) to be successful in this role, but this strategy has not been widely incorporated into practice. The objective of this study is to determine whether the addition of fluoxetine to physical therapy further improves functional outcomes in ischemic stroke patients. **Methods:** Patients are eligible for enrollment in the study if they are 18 to 80 years old with an acute stroke and a post-stroke modified Rankin Scale (mRS) score of 3 or more. Patients taking any antidepressant medication at the time of admission or with a pre-stroke mRS score of 3 or more are not eligible. Patients receive either physical therapy alone or physical therapy in combination with fluoxetine 20 mg daily for 3 months. The following data is being collected: patient age, gender, past medical history, current medications; reported adverse events; mRS, Barthel Index (BI), National Institutes of Health Stroke Scale (NIHSS), and Patient Health Questionnaire (PHQ)-9 scores. Patient progress is monitored with BI, NIHSS, and PHQ-9 scores on Days 0, 30, 60, and 90. The primary outcome of this study is improvement in activity limitations as measured by the mean change in BI score from Day 0 to Day 90. Secondary outcomes include the mean change in NIHSS, NIHSS motor component, and PHQ-9 scores from Day 0 to Day 90 and adverse events attributable to fluoxetine use reported at any time during the treatment period. **Results:** Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the proposed mechanisms by which SSRIs may improve post-stroke motor function.

Discuss available evidence supporting the use of SSRIs for motor recovery after an ischemic stroke.

Self Assessment Questions:

Which of the following scales is the most objective measurement of a patient's ability to independently perform activities of daily living?

- A Barthel Index
- B: Modified Rankin Scale
- C: National Institutes of Health Stroke Scale
- D: Patient Health Questionnaire

What is the proposed mechanism of SSRIs in post-stroke motor function improvement?

- A Reduction of depressive symptoms
- B Improvement in motivation and willingness to take part in physical
- C Hyperactivation of the motor cortex
- D A combination of all of the above

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-314L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF PHARMACIST INTERVENTION ON PATIENT SATISFACTION AND READMISSIONS IN HEART FAILURE PATIENTS

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Background/Purpose: The Hospital Readmissions Reduction Program (HRRP), as part of the Affordable Care Act (ACA), mandates penalties for hospitals with higher-than-expected readmissions for specific clinical conditions such as heart failure.¹ In July 2015, Northwestern Memorial Hospital (NMH) initiated a Bridge and Transition (BAT) team to identify and support heart failure patients by encouraging inpatient cardiology consultation, ensuring one week follow up appointments with healthcare providers, and completing post-discharge telephone calls to assess medication comprehension and compliance. In March 2016, inpatient pharmacists launched a discharge education program targeting BAT patients to further improve medication understanding and satisfaction in this high risk patient population. The purpose of this study will be to assess the impact of pharmacist intervention including, medication education with patient-centered verbal instructions and written materials on patient satisfaction and 30-day hospital readmissions in heart failure patients. **Methods:** This is a single-center, retrospective cohort study of patients who received discharge medication education by a pharmacist in addition to BAT team support compared to patients receiving BAT team support alone. Patients with a B-type natriuretic peptide level >100 pg/mL or those receiving intravenous diuretic therapy from July 2015 through January 2017 were identified to receive BAT team support. Patients receiving discharge medication education were further identified through manual extraction. Patients were excluded if they were < 18 years of age or were discharged from another floor. Multiple patient characteristics will be collected including age, sex, insurance type, and comorbid conditions. The primary endpoint is the 30 day readmission rate. Secondary endpoints included hospital length of stay, days to readmission, number of hospitalizations within the subsequent 12 months, and patient satisfaction. **Results/Conclusion:** To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify direct incentives for hospitals to access readmission rates in heart failure patients.

Discuss interventions implemented to impact 30-day readmission rates and patient satisfaction in heart failure patients.

Self Assessment Questions:

- Per the Hospital Readmissions Reduction Program (HRRP), Centers for Medicare & Medicaid Services (CMS) mandates penalties for hospitals with higher-than-expected readmissions for specific clinical
A: Acute myocardial infarction, urinary tract infections, and heart failure
B: Pneumonia, asthma exacerbation, and heart failure
C: Acute myocardial infarction, pneumonia, and heart failure
D: Hypertension, urinary tract infection, and heart failure

- Which of the following interventions were implemented at NMH to support heart failure patients and prevent readmissions?

- Inpatient cardiology consultation
- Pharmacist discharge education program
- Post-discharge callbacks
- All of the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-904L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

VASOPRESSOR REQUIREMENTS IN MECHANICALLY VENTILATED PATIENTS RECEIVING DEXMEDETOMIDINE VERSUS PROPOFOL

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Purpose: Propofol and dexmedetomidine are commonly used sedative agents in the intensive care unit (ICU), both of which have been known to cause hypotension. Given currently available literature, it is unknown if patients require increased vasopressor support or have variable requirements due to sedating medications. A comparison is needed to determine if there is a difference in vasopressor requirements in patients receiving propofol versus dexmedetomidine while intubated in an ICU. **Methods:** This project was conducted as a multi-center, retrospective, observational cohort study. The study included patients admitted to the intensive care unit at Saint Joseph East and Saint Joseph Hospital between July 2014 and July 2016. The primary endpoint is the incidence of vasopressor use in patients receiving propofol versus dexmedetomidine. Secondary endpoints include duration of vasopressor use, number of vasopressor agents required, maximum infusion rate of sedation prior to vasopressor use, percent change of MAP overtime, and ICU and in-hospital length of stay. Additional data including age, sex, APACHE II score, admitting diagnosis, and midazolam or fentanyl utilization were collected. Data was obtained utilizing physical and electronic health records. The primary endpoint will be evaluated utilizing the chi-squared test (X²). Secondary endpoints will also be evaluated with the chi-squared test (X²) and the Students t-test. An a priori α of 0.05 will be set for significance. Data analysis will be performed using Microsoft Excel and SAS statistical software. These methods have been determined to meet federal exemption criteria by the Catholic Health Initiatives Institutional Review Board. **Results:** Final results and conclusions are pending and will be presented at the Great Lakes Pharmacy Residency

Learning Objectives:

Review current literature that encompasses sedation and vasopressor use

Discuss the differences in vasopressor use between propofol and dexmedetomidine

Self Assessment Questions:

Which of the following is correct regarding pain, agitation, and delirium guidelines with respect to sedative use?

- Non-benzodiazepine sedatives are preferred over sedation with benzodiazepines
- Experts have concluded that benzodiazepines have resulted in higher rates of delirium
- Dexmedetomidine is recommended for the primary treatment of agitation
- Propofol has a rapid offset, even after prolonged periods of time

Dexmedetomidine has which of the following pharmacologic properties that could lead to a decrease in mean arterial pressure?

- Alpha 1 antagonist
- Alpha 1 agonist
- Alpha 2 agonist
- Alpha 2 antagonist

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-652L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF A PHARMACIST DRIVEN MEDICATION DISCONTINUATION PROTOCOL IN AN INTENSIVE CARE UNIT

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PURPOSE: Critically ill patients are susceptible to various medical complications that resolve upon discharge from the intensive care unit (ICU). These conditions often require temporary medications during the ICU admission. The most common initiated temporary medications include antisecretory therapies for stress ulcer prophylaxis (SUP), antipsychotics for ICU delirium and methadone to facilitate continuous intravenous narcotic infusion discontinuation leading to liberation from mechanical ventilation. These temporary medications are initiated with the intent to discontinue the respective agent when the risk for the medical complication is no longer present or the patient is discharged from the ICU. This study aims to establish a process for pharmacists to discontinue temporary medications used in the ICU that will later be implemented throughout Henry Ford Health System. **METHODS:** This was an IRB approved retrospective quasi-experimental study conducted in the medical ICU at Henry Ford Hospital. The pre and post-intervention groups consisted of patients who had their temporary medications discontinued through standard practice and utilizing a standardized pharmacist driven protocol, respectively. Criteria for inclusion were first medical ICU stay for patients >18 years of age initiated on one or more temporary medications for SUP, ICU delirium or weaning of narcotic infusions in mechanically ventilated patients from 11/1/15-1/31/16 for the pre-intervention group and 11/1/16-1/31/17 for the post-intervention group. Randomization for patient inclusion occurred via an online randomizing tool. The primary endpoint was to compare the proportion of patients with inappropriate continuation of temporary medications at ICU discharge between the pre-intervention and post-intervention groups. A sample size of 132 was used to detect a 30% difference in discontinuation. Descriptive statistics Mann-Whitney U, Chi squares and student t-test will be performed. **RESULTS/CONCLUSIONS:** Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the epidemiology of inappropriate continuation of temporary medications upon intensive care unit (ICU) and hospital discharge
Explain the role of a pharmacist driven temporary medication discontinuation protocol in an ICU

Self Assessment Questions:

1) LM is a 30 year old female admitted to the ICU for pneumonia requiring intubation. Her past medical history includes intravenous drug abuse and hypertension. Her home medications include: methadone

- A: Methadone
- B: Pantoprazole
- C: Moxifloxacin
- D: Amlodipine

2) Which of the following represents a goal of pharmacists discontinuing temporary medications prior to ICU discharge?

- A: Increase medication adverse events
- B: Increase hospital re-admission rates
- C: Decrease hospital and patient costs
- D: Decrease physician and pharmacist communication

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-319L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION OF TRANSITIONAL CARE PHARMACIST MODEL AND THE EFFECTS ON READMISSION RATES OF HIGH RISK PATIENTS

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Purpose: Preventing hospital 30-day readmission rates is a leading national concern as it is an indicator of inpatient quality of care. Centers for Medicare and Medicaid Services (CMS) developed financial incentives for healthcare systems to decrease readmissions. This stemmed from the Medicare Payment Advisory Commission's estimation that readmissions result in a \$15 billion increase in annual expenditures. The purpose of this study is to evaluate the effectiveness of interventions made by transition of care pharmacists on patients identified as high risk for readmission. **Methods:** Two transition of care pharmacist positions were occupied effective September 2016 in this three hundred forty-five bed community teaching hospital. Transition of care pharmacists work closely with case managers and discharge planners to determine patients with the greatest need for pharmacist interventions. The admission LACE score which looks at the length of stay, acuity of admission, comorbidities, and emergency department visits is the tool used to determine a patient's risk for readmission. A daily report of patients with a LACE score of 10 or greater is generated to help prioritize workflow. Additionally, transition of care pharmacists are consulted anytime pharmacy specific needs arise regardless of the LACE score. Transition of care pharmacists attempt to perform medication reconciliation, conduct disease state review, provide patient education, assist with medication accessibility, and develop a medication discharge plan for the identified patients. Medication accessibility is facilitated through the hospital's outpatient pharmacy, 340B pricing system, and disease-specific grants. The primary outcome is the 30-day all cause readmission rate; monthly data will be compared to prior years data based on pharmacist interventions. **Results / Conclusions:** Data collection and analysis is ongoing and will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize pharmacist interventions within the transitions of care setting and their impact on patients' hospital readmission rates
Define strategies to overcome barriers in the implementation of the transitional care pharmacist model and in the optimization of the corresponding pharmacists' workflow

Self Assessment Questions:

Which of the following is identified within the role of transitions of care pharmacists upon a patient's hospital discharge?

- A: Obtain prior authorization for medications and set up patient with t
- B: Ensure that the patient follows up post discharge with the primary
- C: Reconcile the discharge medication list with both home and inpatient
- D: Evaluate the care that the patient received while in the hospital

Which of the following barriers has a direct adverse impact on patient transitions of care between various settings?

- A: Inappropriate communication between healthcare providers
- B: Patient's education status
- C: Insurance coverage difficulties
- D: Pending laboratory tests

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-798L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF APPROPRIATE USE OF FLUOROQUINOLONES IN PATIENTS WITH URINARY TRACT INFECTIONS

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Purpose: In July 2016 the Food and Drug Administration (FDA) Warning regarding fluoroquinolones recommended limiting their use in patients with uncomplicated urinary tract infections (UTIs) to reduce the potential for serious side effects associated with their use. Additionally, the most recent antibiogram at the Cincinnati VA Medical Center (CVAMC) shows a decrease in susceptibilities to fluoroquinolones against common urinary bacteria. The purpose of this quality assurance project is to review retrospective data on antibiotic use to determine if fluoroquinolones are appropriately prescribed in urinary tract infections at the Cincinnati VA Medical Center. **Methods:** This IRB-approved quality assurance project is a retrospective chart review. The VA health system electronic medical record was used to identify patients with the ICD10 diagnosis code(s) of uncomplicated urinary tract infection from August 1, 2016-October 31, 2016. The following baseline characteristics were collected: patient age and sex. Descriptive statistics will help determine how many patients with UTIs received fluoroquinolones or other antibiotics. For the patients who received UTI- indicated antibiotics other than quinolones, appropriateness of therapy will be evaluated based upon the following: antibiotic prescribed, urinary analysis, microbiology cultures, sensitivities, and any adverse events or allergies documented for antibiotics. A quinolone (ciprofloxacin or levofloxacin) will be defined as appropriate if the patient does not meet criteria for the first line agents without contraindications. Retrospective information obtained will direct future goals and help determine the need for the implementation of a Urinary Tract Infection Order Set at the CVAMC in order to change prescribing patterns of fluoroquinolones.

Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review the 2016 FDA warning regarding the limitation of fluoroquinolones for defined indications

Review the evaluation of appropriate use of fluoroquinolones in patients with urinary tract infections

Self Assessment Questions:

1. In July 2016, U.S. FDA updated labeling changes and a black box warning for fluoroquinolones stating the serious side effects associated with fluoroquinolone antibacterial drugs generally outweigh

- A acute sinusitis
- B: Acute bronchitis
- C: Uncomplicated urinary tract infections
- D: A,B, and C

2. According to the Study for Monitoring Antimicrobial Resistance Trends (SMART) eleven of the twelve top UTI pathogens demonstrated resistance to fluoroquinolones in varying degrees with an overall _

- A 5%
- B 90%
- C 24%
- D 10%

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-886L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EXAMINATION OF CLONIDINE TAPERING AT A LARGE PEDIATRIC TEACHING HOSPITAL

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Purpose: Pediatric patients requiring prolonged use (>24 hours) analgesic and sedative medications in a critical care setting are at increased risk of developing tolerance and physical dependence. When these medications are abruptly halted, patients can experience a withdrawal symptoms including nervousness, agitation, headaches, rise in blood pressure, and increased catecholamine release. Due to its high bioavailability, favorable half-life, and low acquisition cost clonidine is an ideal enteral medication in patients who need to be slowly weaned off of prolonged analgesic/sedative medication regimens. Currently, no standardized enteral clonidine tapering schedule has been developed at our pediatric institution. The primary objective is to determine a safe and effective clonidine tapering schedule in pediatric critical care patients. A secondary objective is to develop a standardized tapering guideline that could be implemented in practice at our pediatric institution. **Methods:** An evaluation of the current literature will be conducted in order to determine usage of clonidine in a pediatric setting with regards to tapering off of sedative/analgesic medications. A medication use evaluation will be performed to collect information about clonidine usage at a large pediatric hospital. Data collected will include patient demographics, presence of withdrawal symptoms, supportive medications taken, length of intensive care unit/hospital stay, and length of clonidine therapy. Information related to current clonidine tapering and withdrawal symptoms will also be captured. The electronic medical record will be utilized to retrospectively identify patients receiving clonidine after prolonged exposure to sedative/analgesic medications. This medication use evaluation has been submitted to the Institutional Review Board. **Results:** Results and conclusions will be presented at the 2016 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe why clonidine can be a useful agent in pediatric critical care patients who have received prolonged courses of sedative/analgesic medications.

Identify useful monitoring parameters for evaluating the efficacy of a clonidine tapering schedule.

Self Assessment Questions:

On which adrenergic receptor does clonidine mainly exert its agonistic effects?

- A beta-2
- B: beta-1
- C: alpha-2
- D: alpha-1

Which of the following is a validated withdrawal assessment tool that can be used to evaluate patients?

- A Cdoi
- B Wat-1
- C MoCA
- D Pass

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-367L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EXPLORING DIFFERENTIAL ANTIBODY RESPONSE TO BORTEZOMIB IN ORTHOTOPIC HEART TRANSPLANTATION: A RETROSPECTIVE DRUG-USE EVALUATION

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Purpose: The presence of anti-HLA antibodies in patients awaiting heart transplantation has been shown to decrease the likelihood of finding a compatible donor and increase the risk of post transplantation rejection. Desensitization should be considered if a patient's calculated panel reactive antibodies (cPRA) is high enough to decrease the likelihood of finding a compatible donor match. Bortezomib, a first-in-class reversible 26S proteasome inhibitor, has shown to be effective in decreasing anti-HLA antibodies when used off-label in combination with plasmapheresis in highly sensitized orthotopic heart transplant (OHT) candidates. This study will evaluate the efficacy and safety of bortezomib along with plasmapheresis for desensitization and explore the potential factors leading to differential antibody response. **Methods:** This is a retrospective chart review of patients receiving bortezomib in combination with plasmapheresis for OHT from January 01, 2013 to October 01, 2016 while inpatient at Northwestern Memorial Hospital. The primary endpoint is the evaluation of bortezomib with plasmapheresis efficacy based on a regression analysis of each patient's cPRA levels before and after treatment. The secondary endpoints evaluate the safety of the regimen and the exploration of potential factors leading to differential antibody response. Data collected will include, but is not limited to, past medical history including use of a ventricular assist device, previous sensitizing events, immunizations, blood transfusions, prior transplantation, prior desensitization attempts, and baseline characteristics including height, weight, gender, and age. Characteristics of the desensitization cycle will be collected including bortezomib dose, route, frequency, plasmapheresis course, administration of blood products, and side effects including peripheral neuropathy, infections, blood dyscrasias, and gastrointestinal intolerance. Post-treatment outcomes including successful transplantation, freedom from any treated rejection, infection, and survival will be assessed at 1 month, 3 months, 6 months, and up to 1 year after bortezomib administration. **Results/Conclusion:** To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss risk factors/causes of high sensitization in orthotopic heart transplant

Describe potential side effects associated with bortezomib use in desensitization

Self Assessment Questions:

Which of the following is not a risk factor for increased alloreactive antibodies?

- A: Prior blood transfusion
- B: Prior transplant
- C: Male gender
- D: Infection

Which of the following is not a side effect of bortezomib?

- A: Peripheral neuropathy
- B: Thrombocytopenia
- C: Rash
- D: Hypertension

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-470L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION OF ANTIFACTOR-XA (ANTI-XA) MONITORING FOR WEIGHT BASED HEPARIN PROTOCOLS

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Purpose: American College of Chest Physicians recommends activated partial thromboplastin time (aPTT) or anti-Xa level for monitoring unfractionated heparin. Data suggests that the accuracy of aPTT monitoring varies depending on reagent used and patient-specific factors, thus making anti-Xa level monitoring more advantageous in certain patients. Compared to anti-Xa monitoring, aPTT monitoring takes longer to reach therapeutic range, requires more lab draws, and results in less time within therapeutic range. The objective is to identify patients who may benefit from anti-Xa level monitoring, and develop an anti-Xa monitoring protocol. **Methods:** This is a single-center, retrospective chart review and quality improvement project that is exempt from the Institutional Review Board. Patients treated with high-intensity heparin protocol between December 26th, 2014 and September 30th, 2016 will be randomly selected until at least one hundred patients are identified. Using an electronic medical record, the following data will be collected: weight, age, baseline aPTT, number of aPTT draws needed before reaching a therapeutic aPTT, baseline platelet count, baseline INR, indication for heparin, therapeutic heparin infusion rate and number of days on heparin. **Outcomes:** Data will be analyzed for the percentage of patients with a baseline aPTT greater than 40 seconds, percentage of patients that required three or more aPTT draws to reach a therapeutic aPTT and percentage of patients that require a heparin dose of 25 units/kg/hr or greater. **Results/Conclusion:** Data is currently being collected. Results will be analyzed and be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify 3 advantages of monitoring weight-based heparin with anti-Xa monitoring compared to aPTT monitoring.

Recall the therapeutic range for anti-Xa monitoring defined by The American College of Chest Physicians for patients with active venous thromboembolism (VTE).

Self Assessment Questions:

Per American College of Chest Physicians, what is the target anti-Xa range for a patient with VTE?

- A: 0.3-0.7 units/mL
- B: 2-3 units/mL
- C: 0.1-0.3 units/mL
- D: 0.5-1.2 units/mL

Which of the following can affect a patient's aPTT?

- A: Reagent used to perform the test
- B: Baseline elevation in factor XII
- C: Congenital or acquired deficits in clotting factors
- D: All of the above

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-510L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLICATIONS OF HIGH-DOSE EXTENDED-INTERVAL INTRAPARTUM MATERNAL GENTAMICIN ON NEONATES

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Purpose: The use of intrapartum high-dose extended-interval gentamicin is increasingly utilized for various obstetric conditions. The ideal dose of gentamicin in neonates born to mothers who received high dose extended-interval gentamicin during the intrapartum period is not well defined. This study aims to evaluate the safety and efficacy of one institutions gestational age-based gentamicin protocol in neonates whose mothers received intrapartum high-dose extended-interval gentamicin. **Methods:** This is a single-center retrospective chart review of neonates born to mothers who received high-dose extended-interval gentamicin during the intrapartum period. Neonates were included if they received at least one dose of gentamicin post-delivery and had a gentamicin trough level. The primary outcome is the proportion of neonates with elevated gentamicin levels (greater than 1 mcg/mL) in the current study population compared to a historical control group. The primary endpoint will be analyzed using a one-tailed two-proportion z-test with a p-value <0.05 indicating significance. Secondary outcomes include incidence of neonatal gentamicin regimen adjustment calculated sepsis risk score, length of hospitalization, and in-hospital mortality. **Results:** Preliminary results of 31 neonates indicate a median gestational age of 40.4 weeks and a median birth weight of 3.5 kg. Six neonates were admitted to the neonatal intensive care unit. The median gentamicin trough level was 1.4 mcg/mL, with 21 out of 31 (68%) neonates having a gentamicin trough level greater than 1 mcg/mL. Concurrent administration of nephrotoxic medications did not occur in any of the neonates. **Conclusions:** Data collection and statistical analysis is ongoing. Final conclusions will be presented at the 2017 Great Lakes Residency Conference.

Learning Objectives:

Identify benefits of high-dose extended-interval gentamicin in chorioamnionitis, endometritis, and cesarean section prophylaxis
Recall the potential implications of high-dose extended-interval maternal gentamicin on neonates

Self Assessment Questions:

Which of the following is a potential benefit of high-dose extended-interval gentamicin?

- A: Longer post-antibiotic effect
- B: Lower peak concentrations
- C: Decreased risk of toxicity
- D: Both A and C

Following maternal gentamicin administration, what percentage of drug undergoes placental transfer to the fetus?

- A: 5%
- B: 35%
- C: 65%
- D: 95%

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-630L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PROJECT VACCINATE: DEVELOPING A DATA ANALYTICS TOOL TO IMPROVE VACCINATION RATES

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Purpose: With the US healthcare system becoming increasingly value-based, the need for population health has grown. In an effort to improve health-system vaccination rates, a population health data analytics tool was developed to identify patients who are due for pneumococcal and zoster vaccines. The purpose of this study is to validate the data analytics tool to ensure it identifies patients who have not received these vaccines. Based on the findings of the data analytics tool, a pharmacist-driven intervention will be developed and implemented to improve vaccination practices at Henry Ford Health System clinics. **Methods:** A decision tree to identify which patient groups are due for zoster, PPSV23, and PCV13 vaccinations was developed. The CDC immunization schedule was used to determine which patient groups to include in the decision tree. With the help of data analytics staff, a data analytics tool based on the branches of the decision tree was developed to pull medical record numbers for patients due for zoster, PPSV23, and PCV13 vaccinations. To validate the tool, data will be collected for 150 patients due for pneumococcal vaccinations and 50 patients due for the zoster vaccination. Chart review using a standardized case report form will be completed to evaluate if the tool accurately pulled patients based on age, comorbidities, previous vaccines received, and vaccines that are due. Accuracy rates of patients pulled by the data analytics tool for each vaccine will be calculated. **Results and Conclusions:** At Henry Ford Health System, the data analytics tool identified about 844,000 patients due for PCV13, 1.2 million patients due for PPSV23, and 1.3 million patients due for zoster vaccination. Using a data analytics tool can assist pharmacists in identifying patients who are due for zoster and pneumococcal vaccinations and has the potential to increase vaccination rates.

Learning Objectives:

Identify patients due for zoster and pneumococcal vaccinations
Describe the process of creating a data analytics tool

Self Assessment Questions:

Which of the following patients is due for both PCV13 and zoster vaccinations?

- A: 62 yo female with PMH of HTN
- B: 35 yo female with PMH of alcoholic cirrhosis
- C: 67 yo male with no significant PMH
- D: 19 yo male with PMH of asthma

What step needs to be taken ensure the accuracy of data pulled using a data analytics tool?

- A: Create a decision tree
- B: Create the data analytics tool based on the decision tree
- C: Validate the data analytics tool
- D: Implement an intervention based on the data analytics tool

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-483L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ABC, 123 ASP: ANTIMICROBIAL STEWARDSHIP PROGRAM IMPLEMENTATION AT A TERTIARY CHILDRENS HOSPITAL

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Purpose: Centers for Medicare & Medicaid Services conditions for participation and The Joint Commission standards include an antimicrobial stewardship program (ASP) mandate. An effective ASP involves a multidisciplinary team who makes coordinated interventions to reduce unnecessary antimicrobial use and prevent emergence of treatment-resistant pathogens. The purpose of this project is to design and implement an ASP at a tertiary children's hospital in Madison, Wisconsin. **Methods:** A multidisciplinary ASP team was formed. A survey was sent to providers pre-ASP implementation to gather data on antimicrobial prescribing. An internal database using National Healthcare Safety Network logic was used to report antimicrobial days of therapy per 1000 patient days (ADOT/1000PD). The ASP team conducted prospective audit and feedback of all patients receiving antimicrobial therapy three times weekly. Clinical practice guidelines were developed to standardize treatment of neutropenic fever and antimicrobial prophylaxis for pediatric hematopoietic stem cell transplant recipients, optimize use of vancomycin and vancomycin alternatives, and facilitate route interchange. **Preliminary Results:** A 1.0 FTE pharmacist and 0.2 FTE physician was approved. The survey was sent to 386 providers with 21.6% inpatient response rate. No respondents had major concerns regarding the initiation of an ASP. Over 60% of providers stated that correcting dosages, drug-bug mismatches, susceptibility mismatches, and de-escalation are always helpful stewardship initiatives. Fifty-one percent were mostly comfortable prescribing empiric antimicrobials, whereas only 29% were very comfortable. Twenty percent reported some level of discomfort with antimicrobial prescribing. The mean ADOT/1000PD in the pre-ASP implementation period for all antimicrobials was 673 days. Prospective audit and feedback identified an average of 52% of the children's hospital census receives antimicrobial therapy each day. Seven percent of these required ASP intervention. To date, the ASP program has an 83% intervention acceptance rate. **Conclusions:** A established pediatric antimicrobial stewardship program is expected to decrease antimicrobial use and improve overall quality of patient care.

Learning Objectives:

Describe the eight requirement elements of The Joint Commission Antimicrobial Stewardship Standard

List the seven core elements from the Centers for Disease Control and Prevention's Core Elements of Hospital Antibiotic Stewardship Programs

Self Assessment Questions:

Which of the following is a required element of The Joint Commission Antimicrobial Stewardship Standard?

- A: The hospital collects, analyzes, and reports data on its antimicrobials
- B: The hospital employs 1.2 FTE antimicrobial stewardship physicians
- C: The hospital employs 0.8 FTE antimicrobial stewardship pharmacist
- D: The hospital utilizes telehealth in order to provide antimicrobial stewardship

Which of the following is a core element from the Centers for Disease Control and Prevention's Core Elements of Hospital Antibiotic Stewardship Programs?

- A: Institutions must have a microbiology laboratory fellowship program
- B: Senior leadership must develop an antimicrobial stewardship news service
- C: A single pharmacist leader must work to improve antibiotic use
- D: Rapid diagnostic tests must be run on positive blood cultures

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-718L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF APPROPRIATE REFERRALS, DISCHARGES, AND NO-SHOW RATES TO OPTIMIZE PHARMACIST TIME IN PATIENT-ALIGNED CARE TEAMS (PACT)

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Purpose: The primary purpose of this research is to assess and evaluate the no-show rates of veterans in the primary care setting at the Indianapolis VAMC while also evaluating whether or not patients are appropriately referred and/or discharged to the pharmacist for chronic disease state management by the primary care physician. Additional targets will be developing standard practices to reduce overall no-show rates as well as formulating referral and discharge guidance for the facility. The ultimate goal of this process improvement project is to optimize pharmacist utilization within the PACT healthcare delivery model. **Methods:** Methods for patient communication about appointment reminders, definition of no-shows, and documentation for patient no-shows have been evaluated and are inconsistent across primary care clinics within the Indianapolis VAMC. Similarly, the patient referral and discharge process is inconsistent, potentially leading to inappropriate pharmacist utilization within the PACT team. Researchers have and will continue to facilitate focus groups from the respective clinics to identify current problems within the system, trial potential solutions, and implement best practices from the findings. Results from this project will be used to change standard practice within primary care clinics at the Indianapolis VAMC with hopes to maximize pharmacist involvement in clinic, ensure pharmacists are practicing at the top of their license, and ultimately increase patient access. **Results:** Final results to be presented at Great Lakes Residency Conference. **Conclusions:** Routine practices are inconsistent across primary care clinics at the Indianapolis VAMC. Changing check-out procedures so the patient schedules his appointment before leaving clinic has decreased no-show rates for face-to-face visits; however phone visits have remained the same. Additionally, doing patient reminder calls for the scheduled appointment yielded similar results. Proper referral and discharge processes were streamlined and made more consistent in conjunction with the PACT operations committee after creating a pamphlet with guidance for providers.

Learning Objectives:

Discuss specific process improvements that helped metrics in PACT team clinics at the Indianapolis VAMC

Identify strategies used as guidance for physicians in the primary care setting at the Indianapolis VAMC

Self Assessment Questions:

Which of the following areas benefited as a result of changing the check out process at the Indianapolis VAMC?

- A: Face-to-face no-show rates
- B: Phone no-show rates
- C: Telehealth no-show rates
- D: Physician no-show rates

Which of the following disease states were incorporated in the referral guidance at the Indianapolis VAMC?

- A: Hypothyroidism
- B: COPD
- C: Hyperlipidemia
- D: Smoking cessation

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-834L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ASSOCIATION BETWEEN IN UTERO POLYSUBSTANCE EXPOSURE AND THE NEED FOR ADJUNCT THERAPY IN INFANTS TREATED WITH PHARMACOTHERAPY FOR THE MANAGEMENT OF NEONATAL ABSTINENCE SYNDROME (NAS).

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Purpose: An unintended consequence of the opioid epidemic is an increase in the incidence of infants presenting with Neonatal Abstinence Syndrome (NAS). NAS is a condition resulting from the withdrawal of chronic in utero exposure to opiates and other classes of drugs causing the infant to be physically dependent typically between 48 and 72 hours of age. Opiates along with adjunct medications are used to manage this condition. NAS results in a major health burden in terms of the cost and family emotional burden secondary to prolonged hospitalization often required to wean infants with NAS off narcotic medication. The primary objective of this study is to determine the need for adjunct therapy in polysubstance exposed infants and evaluate the incidence of need for adjunct therapy. **Methods:** This retrospective, single center, chart review will include all infants who have received pharmacologic therapy for the management of NAS at UCMC from January 1, 2013 to December 31, 2016. For the purpose of this study, adjunct therapy will be defined as therapy that is used in addition to the primary opioid replacement treatment. Polysubstance exposure will be defined as in utero exposure to more than one class of drugs such as cocaine, amphetamines, and/or benzodiazepines. All infants born at gestational age > 34-weeks who present with NAS and required pharmacologic management at UCMC will be included. Exclusion criteria will consist of infants born at less than 34-weeks gestation or born with non-NAS neurologic conditions. Clinical outcomes compared include the need for use of a second agent (adjunct therapy) for infants with in utero polysubstance exposure in comparison to opiate-only exposed infants and to identify whether individual or combinations of agents may be independent predictors of the need for adjunct therapy in infants treated for NAS. **Results:** Data collection and analysis are ongoing.

Learning Objectives:

Explain the medications and illicit substances associated with (NAS) after chronic exposure in utero

Discuss tools available for NAS assessment and pharmacologic therapy management options

Self Assessment Questions:

Which scoring tool is the most comprehensive method of determining the severity of NAS symptoms?

- A: Finnegan NAS Scoring Tool
- B: Lipsitz Neonatal Drug-Withdrawal Scoring System
- C: Ostrea Tool
- D: Neonatal Withdrawal Inventory

Which of the following is false?

- A: There was about a 300% increase in NAS births from 1999 – 2013
- B: Cocaine is associated with severe withdrawal symptoms.
- C: Infants that present with NAS have an average length-of-stay of at
- D: Methadone, buprenorphine, phenobarbital, clonidine, and morphine

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-522L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPROVING PATIENT EDUCATION FOR CHEMOTHERAPY-INDUCED NAUSEA AND VOMITING PROPHYLAXIS IN THE BREAST CANCER CLINIC AT AN ACADEMIC MEDICAL CENTER.

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Purpose: Chemotherapy-induced nausea and vomiting (CINV) remains a challenging side effect experienced by oncology patients. At Froedtert & the Medical College of Wisconsin (F&MCW), there is no consistent method for nurses to document patient education of CINV prophylaxis, leading to incongruences between F&MCW CINV guidelines, CINV medications prescribed, and CINV education provided by nurses. This can result in patient confusion and non-adherence. The purpose of this project is to identify and classify the discrepancies occurring in the Breast Cancer Clinic at F&MCW. Analysis of the discrepancies will be used to create a standardized education and documentation tool to support consistent nursing practices and help with order reconciliation at the time of patient education. The goal of this tool is to decrease confusion among patients and nursing staff during transitions of care.

Methods: A pre/post chart review analysis is combined with staff satisfaction surveys. Patients in the Breast Care Clinic undergoing their first cycle of the highly emetogenic chemotherapy regimen AC (doxorubicin or epirubicin with cyclophosphamide) will be evaluated March 1st, 2016 - May 31st 2016 (pre-implementation) and February 6th, 2017 - May 6th, 2017 (post-implementation). The primary outcome compares the incidence of discrepancy between CINV medications prescribed to the patient versus CINV education by clinic nurses. Secondary outcomes assess discrepancies between CINV prescribing, CINV guidelines, and CINV education, the process adherence to the F&MCW CINV guidelines, the rationale behind discrepancies found, an analysis of the documentation of education in the medical record, and nursing satisfaction surveys. Following the analysis of the pre-implementation data, a "Nausea Calendar" will be created and accessible in the Electronic Health Record. Post-analysis of satisfaction and outcomes will be used to evaluate the calendar's effectiveness.

Preliminary results and conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

List three benefits of the placement of the antiemetic calendar in the Electronic Health Record.

Identify three key stakeholders that need to collaborate for the optimal prescribing, education, and reinforcement of CINV medications

Self Assessment Questions:

Easy access to antiemetic calendars in the Electronic Health Record (EHR) is desired for which of the following reasons?

- A: It allows consistent reinforcement of medication regimens by the n
- B: It improves the transition of care from the oncology clinic setting to
- C: It can easily be printed so that the patient can receive extra copies
- D: All of the above

Which of the following healthcare professions needed to collaborate to ensure the best quality of CINV prescribing, education, and reinforcement is given to patients?

- A: Pharmacy
- B: Nursing
- C: Physicians
- D: All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-547L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EFFECT OF CHRONIC ANTIHYPERTENSIVE TREATMENT ON RESPONSE TO VASOPRESSORS FOR SEPTIC SHOCK.

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Sepsis-3 defines septic shock as a subset of septic patients at an increased risk of mortality due to profound underlying circulatory and cellular metabolism abnormalities. Clinical criteria for septic shock include lactate >2 mmol/L and vasopressors needed to maintain mean arterial pressure (MAP) greater than or equal to 65 mmHg despite adequate fluid resuscitation. There are currently no studies that have evaluated the effect of antihypertensive treatment on vasopressor requirement for patients with chronic hypertension who present with septic shock. The purpose of this study is to determine whether chronic antihypertensive treatment affects the response to vasopressors for septic shock. This is a single-center, retrospective cohort study in a 495-bed tertiary care hospital. Baseline data were collected for 361 septic patients admitted between May 2014 and June 2015. Patient demographics, vital signs, lab results, culture results, severity of disease, and medications will be recorded and analyzed. The primary endpoint is the addition of a second vasopressor agent. Secondary endpoints will include in-hospital mortality, development of arrhythmia, and need for renal replacement therapy. All continuous data will be analyzed using an independent samples t-test. Categorical data will be analyzed using a Chi-squared test or Fisher's exact test. Subgroup analysis will include a comparison of antihypertensive medication class and number of outpatient antihypertensive agents. Data collection is currently being conducted. Results and conclusion to be determined.

Learning Objectives:

Discuss the 2016 Surviving Sepsis Campaign Guideline recommendations for the treatment of septic shock.

Review the pathophysiology of blood pressure autoregulation and the impact of chronic hypertension.

Self Assessment Questions:

What is the recommended initial target mean arterial pressure (MAP) for patients with septic shock requiring vasopressors?

- A: >60 mmHg
- B: >65 mmHg
- C: 65-70 mmHg
- D: >85 mmHg

Which vasopressors are recommended as second-line therapy after starting norepinephrine for septic shock patients?

- A: Phenylephrine and dopamine
- B: Epinephrine and phenylephrine
- C: Dopamine and epinephrine
- D: Epinephrine and vasopressin

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-700L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DETERMINING THE EFFECTIVENESS OF A GROUP DIABETES EDUCATION PROGRAM IN A CHAIN COMMUNITY PHARMACY-PILOT STUDY

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Objectives: The objectives of this study are to determine the impact of a group diabetes education program with added point-of-care testing (POCT), on knowledge gained, clinical outcome measures, and patient satisfaction. **Methods:** Program participants will

Learning Objectives:

Discuss the benefits and obstacles of implementing a group diabetes education program in a chain community pharmacy.

Describe the group diabetes education program that was implemented in the chain community pharmacy and the methodology used to evaluate it.

Self Assessment Questions:

What obstacles can hinder the implementation of a diabetes education program?

- A: time
- B: marketing
- C: legal issues
- D: all of the above

Which of the following methods was used to evaluate the effectiveness of the group diabetes program in the chain community pharmacy?

- A: Quality of life questionnaire
- B: Medication Adherence Rating Scale (MARS)
- C: Pre and post survey
- D: Inferential statistics

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-973L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PROSPECTIVE COMPARISON OF MEDICATION RECONCILIATION COMPLETED BY NURSES VERSUS TRAINED PHARMACY TECHNICIANS IN THE EMERGENCY DEPARTMENT

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The Pharmacy Practice Model Initiative encourages the advancement of pharmacy technicians role allowing pharmacists to practice at the top of their license. Previous studies show that technicians are equally efficacious as pharmacists when completing medication reconciliation, and showing a relative risk reduction of 77% in error rate compared to non-pharmacy personnel. The purpose of this study is to demonstrate the clinical benefit of trained pharmacy technicians gathering medication histories within the Emergency Department (ED). A prospective study will be completed at HSHS St. Johns Hospital in the ED. Inclusion criteria include: patients admitted to hospital through the ED, >18 years of age, and who are alert or have a caregiver present who is aware of the patients medication use. Exclusion criteria include: estimated time in ED less than one hour and patients who cannot provide a medication history or outpatient pharmacy. In the first phase, ED nurses will collect patients medication history. A pharmacy resident will then complete the medication history again and collect data regarding errors. Following the initial phase, pharmacy technicians will be educated on how to properly and accurately collect medication histories from patients. An education tool has been developed and trained technicians will also use interview guides and templates during each patient interview. Phase two will consist of the trained pharmacy technicians completing the initial medication history instead of an ED nurse. A pharmacy resident will then gather the patients medication history again as in phase one. Following both phases, hospitalists will complete a physician satisfaction survey regarding the medication reconciliation process. The primary outcome is the rate of medication reconciliation errors. Secondary outcomes include: Cost avoidance, description of error type, change in physician satisfaction, and incidence of physicians completing reconciliation prior to medication history collection. Results and conclusion will be reported at a later date.

Learning Objectives:

Discuss the financial and clinical benefits of healthcare providers or pharmacy technicians gathering an accurate medication history. Describe and evaluate the data that supports the use of pharmacy technicians collecting medication histories within the emergency department.

Self Assessment Questions:

Which of the following statements are true?

- A 10 percent of hospital admissions experience adverse events due
- B: Proper medication reconciliation procedure can prevent up to 85 p
- C: An adverse effect due to a medication error can increase length of
- D: A conservative cost per medication related adverse event is \$500

What type of data supports using trained pharmacy technicians for gathering medication histories in the emergency department?

- A Observational studies comparing trained pharmacy technicians an
- B Prospective, multicenter trials within emergency departments
- C Randomized controlled trials comparing pharmacy technicians an
- D Retrospective, multicenter trials within emergency departments

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-919L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
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OPTIMAL CALCINEURIN INHIBITOR BASED MAINTENANCE IMMUNOSUPPRESSION IN LUNG TRANSPLANT RECIPIENTS

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Purpose: Based primarily on clinical experience with other solid organ transplants, the optimal maintenance immunosuppression regimen for lung transplant recipients, to date, has been speculative. As the primary immunosuppressive agents utilized following lung transplant adequate serum levels of calcineurin inhibitors are necessary to quell the rejection response while balancing their potential toxicities. As such defining the optimal calcineurin inhibitor serum concentration necessary to suppress the rejection response at various intervals following transplant is crucial. The purpose of this study was to evaluate the degree of immunosuppression in lung transplant recipients and the associated rates of biopsy proven acute rejection. Methods: This retrospective, single-center study was approved by the Institutional Review Board. Patients who received a lung transplant between January 1, 2011 and December 31, 2015 were included for analysis, while those who underwent re-transplantation were excluded. All recipients received maintenance immunosuppression with the calcineurin inhibitor, tacrolimus, an antimetabolite, and a corticosteroid in accordance with the institutions lung transplant protocol and were subject to scheduled surveillance biopsies of the lung allografts. The degree of immunosuppression was determined based on serum tacrolimus trough levels. The protocol identifies a goal serum tacrolimus trough level of 10-12 mcg/L for the first three months post-transplant and 8-10 mcg/L thereafter. Recipients were evaluated for the initial 12 months post-transplant to assess the amount and intensity of acute rejection rates. Each patient served as their own control when comparing the average trough levels over the first three months post-transplant to the average trough levels over the subsequent three to twelve months. Secondary outcomes included rates of bronchiolitis obliterans syndrome, cytomegalovirus (CMV) infection, non-CMV infection, and mortality. Continuous and categorical variables were analyzed for significance using Students t tests and chi-square analyses respectively. Results/Conclusions Results and conclusions will be presented at the 2016 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Explain the indications for and incidence of lung transplantation worldwide

Recognize the challenges associated with immunosuppression post lung-transplant

Self Assessment Questions:

Which of the following is an indication for lung transplant?

- A Coronary artery disease
- B: Chronic obstructive pulmonary disease
- C: Congestive heart failure
- D: Diabetes mellitus

Which of the following is true regarding challenges associated with post-lung transplant immunosuppression?

- A There is an abundance of literature regarding maintenance immun
- B There are no immunosuppressive agents specifically approved by
- C One standard protocol drives the immunosuppression regimen of l
- D Studies have shown decreased mortality in lung transplant patient

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-364L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION OF A HYPOGLYCEMIA SCREENING TOOL AT THE ALEDA E. LUTZ VA MEDICAL CENTER TO IMPROVE SAFETY IN PATIENTS WITH HIGH RISK FACTORS FOR HYPOGLYCEMIA

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PURPOSE:

Literature has shown that patients who have already developed complications of diabetes may be at a greater risk for harm with continued tight glycemic control. In 2014, the Department of Veterans Affairs (VA) developed a national initiative to address this concern. The Hypoglycemia Safety Initiative (HSI) was developed to identify Veterans at highest risk for hypoglycemia, evaluate their current therapy, and establish individualized glycemic goals for patients. The purpose of this project is to implement a hypoglycemia screening tool at the Aleda E. Lutz VA Medical Center.

METHODS:

This quality improvement project was exempt from review by the Institutional Review Board. The HSI National Data Warehouse was used to identify patients whose A1c is less than 7%, are taking insulin and/or a sulfonylurea, and have one or more of the following risk factors: age 74 or older, diagnosis of cognitive impairment or dementia, and renal impairment (serum creatinine greater than 1.7 mg/dl). Permission was gained by providers to contact patients identified as high risk for hypoglycemia. Patients/caregivers will be contacted through telephone encounters to assess for hypoglycemia and difficulties with their medication regimen. Using this information along with patient specific factors, an open discussion about risks and benefits of therapy will be used to establish an A1c target and to determine if medication adjustments are needed based on patient preference and clinical indication. Telephone follow-ups will be completed to assess for tolerability of medication changes and reduction in incidence of hypoglycemia. An A1c will be evaluated three months after any therapy changes to assess if patients remain within their established goal. All patients/caregivers will receive education on preventing and treating hypoglycemia.

RESULTS/CONCLUSIONS:

Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the impact pharmacists may have by completing hypoglycemia screenings in high risk patients.

Recognize patient and drug specific factors that can be incorporated into a shared discussion for determining an appropriate A1c target for a patient.

Self Assessment Questions:

Which of the following is most commonly addressed through hypoglycemia screenings?

- A Discontinuing glycemic therapy
- B Reducing patient's treatment costs
- C Adjusting glycemic therapy
- D Hypoglycemia education

Which of the following risk factors put a patient at greatest risk for hypoglycemia?

- A Age >65, diabetes for >10 years, renal impairment
- B Age >74, renal impairment, cognitive impairment
- C Age >74, diabetes for >10 years, lives in a group home
- D Presence of comorbidities, diabetes for >10 years, lives in a group

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ASSESSMENT OF PHARMACIST-MANAGED AMBULATORY CARE ASTHMA CLINIC

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Purpose: Asthma is a common chronic disease in the United States, affecting approximately seventeen million adults and six million children in 2014. Although the number of asthma-related deaths has decreased recently, significant morbidity due to exacerbations remains. Pharmacist involvement in the management of asthma has been shown to improve outcomes and quality of life. This has been demonstrated in a variety of settings, however to a lesser extent in pharmacist-managed clinics. The purpose of this study is to assess the effectiveness of a pharmacist-managed asthma clinic in improving asthma outcomes in the ambulatory care setting. **Methods:** This Institutional Review Board approved observational cohort study seeks to assess the effectiveness of the asthma clinic by measuring the number of asthma-related hospitalizations and emergency department visits in pediatric patients with asthma in the twelve months prior to and after the initial visit. **Secondary outcomes** include asthma control test (ACT) scores, asthma quality of life questionnaire (AQLQ) scores, missed days at work or school, recommendations made to the patient, asthma medications prescribed at each visit, and follow-up visits with Saint Joseph Family Medicine Center (SJFMC) physicians. Patients eligible for enrollment include those eighteen years of age or younger with asthma, referred to the clinic by a SJFMC physician. Pharmacist interventions include providing patients with self-management education, action plans, and making pharmacotherapy recommendations to physicians as necessary. **Data collection** includes previously mentioned outcomes and pertinent patient medical history via patient interview and chart search. The primary and secondary endpoints will be evaluated using the paired t-test. **Results:** As of January 2017, sixteen patients were referred to the clinic and three patients completed the initial visit. Mean interim ACT scores at initial visit: 18.33 versus 22 at final visit. **Conclusions:** Final results and conclusions will be presented at the 2017 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify common barriers that may inhibit patients from attaining optimal asthma control

Describe the four components of asthma care necessary to achieve and preserve asthma control

Self Assessment Questions:

Which of the following is a BEHAVIORAL barrier to obtaining optimal asthma control?

- A Cost of treatment
- B Comorbidities
- C Suboptimal assessment
- D Exposure to triggers

What asthma education topics should be reinforced at each patient encounter?

- A Controller versus rescue medications
- B Asthma pathophysiology
- C Self-monitoring skills
- D All the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-589L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

CHARACTERIZING CLOSTRIDIUM DIFFICILE INFECTION RATES, RISK FACTORS AND OUTCOMES IN HEMATOPOIETIC STEM CELL RECIPIENTS

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Introduction: According to the Center for International Blood and Marrow Transplant Research, approximately 19,000 patients underwent hematopoietic stem cell transplant (HSCT) in 2013. While the use of HSCT for the treatment of various malignant and non-malignant disorders has transformed patient outcomes for the better, the treatment is still associated with many risks. One of the most significant risks to patients after HSCT is infection. Patients receiving HSCT undergo a variety of conditioning regimens which make them susceptible to infection. Furthermore, during episodes of neutropenia, prior to engraftment, patients are often placed on prophylactic antibacterial, antifungal, and antiviral regimen. The most common nosocomial infections seen in HSCT patients are bacteremia, pneumonia, and diarrhea. Infectious diarrhea due to *Clostridium difficile* (*C. diff*) is commonly seen in HSCT patients, especially in those receiving allogeneic stem cell transplant. Currently available literature on *C. diff* infection after HSCT contains large variability in potential risk factors and outcomes for HSCT patient population, suggesting that these results may be specific to the sites conducting the research. There is some evidence to suggest a correlation between *C. diff* infection and developing graft-versus-host disease. **Purpose:** The purpose of this study is to identify the incidence, risk factors, and outcomes of *C. diff* infection in patients undergoing HSCT at the University of Illinois Hospital (UIH). Collecting data on the incidence and potential risk factors for *C. diff* at UIH may help aid improve screening and treatment of patients at risk for *C. diff* infection and potentially decrease transplant-related morbidity. **Methods:** The study is a retrospective chart review. Patient data will be collected through a Cerner-generated report identifying patients who underwent HSCT at UIH. Collected data will be stored in REDcap program. **Results:** Data collection for the study is still ongoing and the results will be presented at Great Lakes

Learning Objectives:

Identify the risk factors for *C. diff* infection in hematopoietic stem cell transplant patients

Describe the outcomes of *C. diff* infection in patients receiving hematopoietic stem cell transplant at the University of Illinois Hospital

Self Assessment Questions:

All of the following are risk factors for *C. diff* infection in hematopoietic stem cell transplant patients, EXCEPT:

- A: Treatment with PPIs/H2 blockers
- B: Receipt of cancer chemotherapy
- C: Treatment with broad-spectrum antibiotics
- D: All of the above are correct answers

C. diff infection may indirectly affect mortality outcomes in hematopoietic stem cell transplant patients by having direct correlations with graft-versus-host disease.

- A: True
- B: False
- C: N/a
- D: N/a

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-685L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

CHARACTERIZING THE INCIDENCE RATE AND RISK FACTORS FOR BACTEREMIA IN CARDIAC ARREST PATIENTS

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Statement of the Purpose: Cardiac arrest is a life-threatening event resulting from a culmination of known and unknown complex factors. Research can help identify the diseases, conditions, and other risk factors that may increase the chances for a cardiac arrest and its various resultant sequelae. Bacterial infection, specifically bacteremia, is a potential cause and/or complication of cardiac arrest that has received increasing notoriety in recent years. **Statement of the Methods Used:**

This is a retrospective, single centered cohort study characterizing the incidence of bacteremia in cardiac arrest patients. Patients were identified by chart review with an ICD-9 code diagnosis of cardiac arrest. The primary objectives of this study are to determine the incidence rate of bacteremia associated with cardiac arrest and to identify risk factors that may correlate with a higher likelihood of suspecting bacteremia as an incident event. Secondary outcomes include intensive care unit and hospital length of stay and twenty-eight day mortality. Patients eighteen years and older were included if they presented with or suffered a non-traumatic cardiac arrest at Loyola University Medical Center and had blood cultures drawn. Patients were divided into two groups: those with bacteremia vs. those with negative cultures. Bacteremia was defined as >2 blood cultures positive for the same normal skin pathogen or >1 blood culture positive for typical infectious pathogens. Negative cultures were defined as >2 blood cultures with no growth after 5 days or one out of two blood cultures positive for a normal skin flora pathogen (considered a contaminant). Patients were further divided into those who suffered a cardiac arrest outside of the hospital vs. inside the hospital, and those who had return of spontaneous circulation (ROSC) vs. those who did not. **Summary of Results to Support Conclusions:** Pending **Conclusions Reached:** Pending

Learning Objectives:

Explain how bacteremia could precipitate a cardiac arrest

Discuss the current literature examining the prevalence of bacteremia in cardiac arrest patients

Self Assessment Questions:

During sepsis, a number of myocardial depressant substances are released including:

- A: Calcium
- B: Potassium
- C: Cytokines
- D: Insulin

The most common organism identified in bacteremic cardiac arrest patients in previous studies has been:

- A: *Staphylococcus aureus*
- B: *Escherichia coli*
- C: *Candida*
- D: *Pseudomonas*

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-701L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION OF PHARMACY INVOLVEMENT IN A DISCHARGE MEDICATION EDUCATION AND RECONCILIATION PROCESS FOR TARGETED HEART FAILURE PATIENTS AT A COMMUNITY HOSPITAL

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Purpose: This quality improvement project will pilot a pharmacist-led service to facilitate reconciliation of medications and provide medication education at discharge for heart failure patients. The goal of this project is to determine if pharmacist participation will lead to an improved process, measured primarily by the number and type of interventions made by pharmacists and secondarily by patient readmission within 30 days of discharge. **Methods:** Prior to implementation of the pilot, background data was collected by performing retrospective medication reconciliation on a randomly selected group of patients to quantify pharmacy interventions and show the value of pharmacist involvement in the discharge process. After background data collection, the discharge medication reconciliation process involving pharmacists will be created and piloted in patients with a new diagnosis or exacerbation of heart failure. Patients who qualify for services will be identified by case management, who will then utilize an electronic communication board to alert pharmacists of the patients discharge plan, including date, time, and location. Once notified, the pharmacist will review the patients home medications compared with hospital medications to develop an accurate, appropriate, and evidence based discharge medication list. After medication reconciliation completion, the pharmacist will notify the provider and provide recommendations for modifications to the home medication list. The pharmacist will also evaluate concerns regarding access to and affordability of the medications and recommend alternatives if necessary. After discharge medications are finalized, the pharmacist will provide medication education and adherence aids to facilitate patient understanding. **Preliminary Results:** Retrospective data collection demonstrated opportunity for pharmacists to intervene in the discharge process. Of 35 patient profiles retrospectively reviewed, 104 possible interventions were identified. **Conclusion:** Pharmacist involvement in the discharge process has the potential to prevent pharmacotherapy problems and decrease 30-day readmission rates. Implementation of a successful discharge medication reconciliation and education process requires involvement from an interdisciplinary team.

Learning Objectives:

Describe the process of implementing a discharge medication reconciliation and education service at a community hospital
Identify best practices for providing patient education on heart failure pharmacotherapy

Self Assessment Questions:

Which of the following statements is correct?

- A Pharmacists can initiate and maintain a discharge medication reconciliation
- B: An interdisciplinary team is best for a successful discharge medication reconciliation
- C: It is not necessary to contact the provider with recommendations concerning medication changes
- D: It is not necessary to provide medication education to patients who are discharged

Which of the following would create the most beneficial patient education aid?

- A A 6-page medication monograph with a complete list of indications
- B A list of medications the patient should be taking, supplemented by patient education materials
- C A succinct informational handout with details pertinent to the medication
- D A handout comprised solely of pictures.

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-891L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DEVELOPMENT OF A WEB APPLICATION TO STREAMLINE MANAGEMENT OF "WHITE BAGGED" MEDICATIONS

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Purpose: White bagging is a term used to describe a procurement process in which medications are supplied by a patient rather than by a health care facility. It is distinct from buy-and-bill procurement in that these medications are shipped from a specialty pharmacy on behalf of a patient and delivered to a clinic or office for administration by a provider. White bagging can pose a number of challenges, some of which include inventory management, tracking, and charging issues. The purpose of this project is to design and implement a web-based application to manage white bagging processes within Aurora Health Care.

Methods: An analysis of white bagging was conducted to determine current-state processes. A new white bagging workflow was then designed, and specifications for a web application were created to meet these needs of this workflow. These specifications were reviewed by subject matter experts and revised as appropriate. Aurora's application development team was then engaged to begin creating the application. The application was developed through an iterative process between pharmacy and the application team. Concurrent to the development of this app, a number of alerts and configuration records were deployed within the electronic health record to support the integration of this web application into the patient chart. Numerous metrics were developed to justify the implementation of the white bagging application. Among them were metrics related to the rate of billing errors, inventory errors, and user satisfaction. **Results and Conclusions:** Preliminary results and conclusions of this project will be presented in detail at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the challenges faced by health systems in using white bagging as opposed to buy-and-bill workflows.
Identify the benefits of utilizing an integrated electronic application for the management of white bagged medications.

Self Assessment Questions:

Which of the following is/are a challenge created by white bagging processes?

- A Inventory and tracking issues
- B: Billing issues
- C: Medication preparation issues
- D: A and B

Which of the following is a benefit of utilizing an integrated application to manage white bagged medications?

- A System-wide visibility of white bagged inventory
- B No maintenance costs
- C The ability to notify pharmacists of white bagged medications during patient visits
- D A and C

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-787L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF THE EFFECT ACETAZOLAMIDE HAS ON POSTOPERATIVE INTRAOCULAR PRESSURE REDUCTION FOLLOWING CATARACT SURGERY

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Purpose: Cataract formation is the most common age-related eye disease in the United States. One potential complication of cataract surgery is the development of transient intraocular hypertension. Oral acetazolamide may be used prophylactically at the conclusion of cataract surgery to lower postoperative intraocular pressure (IOP). Current literature shows an inconsistent use of acetazolamide in this setting. It is also not known if specific populations would get most benefit from this therapy. Limited evidence indicates that known risk factors for ocular hypertension include diabetes, dyslipidemia, and systemic hypertension. The objectives of this study are to determine the effect of acetazolamide on postoperative IOP in patients undergoing cataract surgery, and to evaluate if certain populations, based on risk factors, should be receiving acetazolamide to lower postoperative IOP.

Methods: Approval through the Institutional Review Board was obtained prior to data collection. A retrospective chart review was conducted utilizing the electronic medical record. All data were recorded without patient identifiers and maintained confidentially. Eligible patients include those 18 years of age and above undergoing cataract surgery at Gundersen Health System between January 2010 and December 2012. Patients were excluded if they were on chronic carbonic anhydrase inhibitor therapy, or if they had a past medical history of glaucoma. The study will compare postoperative IOP in patients receiving acetazolamide versus patients not receiving acetazolamide after undergoing cataract surgery. The data collected for each patient includes: age, sex, postoperative IOP, and presence of comorbid conditions including diabetes, hypertension, and/or dyslipidemia. Statistical analysis will be completed using the Student's t-test.

Results/Conclusions: Data collection is ongoing. Final results and conclusions will be presented at Great Lakes Pharmacy Conference in April, 2017.

Learning Objectives:

Discuss pharmacological prophylaxis options for elevations in IOP after cataract surgery

Relate postoperative IOP in patients with comorbid conditions, including diabetes, hypertension, and dyslipidemia, among those who received acetazolamide to that of those who did not receive acetazolamide

Self Assessment Questions:

Based on research studies, which of the following dosing schedules of acetazolamide has been most commonly used for postoperative IOP reduction in patients undergoing cataract surgery?

- A: One time the evening before surgery
- B: Daily for seven days after surgery
- C: One time immediately after surgery
- D: Daily for three days after surgery

Studies have shown that which of the following disease states are risk factors for increases in IOP?

- A: Emphysema
- B: Hypertension
- C: Cancer
- D: Asthma

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-331L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

COMPARISON OF DOCUMENTATION OF RASS SCORES WITHIN THE ICU FOLLOWING NURSING EDUCATION AT THE HUNTINGTON, WV VETERANS AFFAIRS MEDICAL CENTER

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Purpose of the Research: Titrated medication orders play an important role in patient care in controlled environments such as those used in intensive care units to expedite proper dosing and optimize patient care. By definition, medication orders that are titrated allow bedside medication adjustments to be progressively increased or decreased based on patients response and clinical status. Utilization of the titration orders must have clearly defined parameters to ensure each nurse has objective measures to follow to minimize medication errors associated with their use and variance in protocol. Proper documentation of dose adjustments and patient response to each adjustment is an important aspect of the titration order process. One of the goals of this study is to assess pharmacy-led modifications in the titration order sets and documentation process as well as educating nursing staff on appropriate documentation of titrations. The goal is to obtain appropriate documentation of proper sedation/pain relief along with medication adjustments to enhance patient outcomes. **Methods:** Retrospective chart reviews will be performed to evaluate various parameters used to assess proper documentation of RASS and pain scores prior to nursing education and following education as well as changes in medication order sets. Evaluation will include time-to-achieve prescribed titration parameters, patient demographics, medication usage, length of ICU stay, as well as ventilator days (as applicable). **Results & Conclusions:** Results and conclusions are currently pending and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review purpose of RASS scoring along with strengths and weaknesses
Recognize appropriate types of sedation order-sets with titration parameters

Self Assessment Questions:

Which of the following could we see improvements in, following appropriate documentation and order sets of RASS Scores?

- A: Decrease in ICU associated delirium/PTSD
- B: Improved patient outcomes
- C: Decrease in medication use/Ventilator Days
- D: All of the above

Which of the following includes the appropriate parameters for sedation titration?

- A: Sedation goal, drug titration amount, RASS score
- B: Starting dose, indication for titration, maximum dose
- C: Sedation goal, how often to assess patient, increments to increase
- D: How often to assess patient, drug titration amount, RASS score

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-942L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

COMPARATIVE NEPHROTOXICITY OF AMINOGLYCOSIDES AND POLYMYXINS DURING THE TREATMENT OF MULTIDRUG-RESISTANT GRAM-NEGATIVE INFECTIONS

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Purpose: The increasing prevalence of multidrug-resistant (MDR) Gram-negative pathogens has introduced numerous challenges for healthcare providers when treating these patients. Due to a lack of therapeutic options, there has been resurgence in the use of older antibiotic classes including polymyxins (colistin and polymyxin B) and aminoglycosides. These agents are known to cause nephrotoxicity. There have been studies that have assessed the nephrotoxic effects in patients receiving aminoglycosides or polymyxins but few comparative data in similar patient populations. The purpose of this study is to compare nephrotoxicity among patients receiving these last-line antibiotic agents in a multicenter, retrospective study. **Methods:** Patients will be identified through both University of Illinois Hospital & Health Sciences System and Northwestern Memorial Hospital records based upon antibiotic use specifically with aminoglycosides, polymyxin B or colistin for the treatment of a MDR Gram-negative bacterial infection from 01/01/2006 to 08/01/2016. Patients excluded from the study are those who are < 18 years of age, have end stage renal disease or anyone requiring renal replacement therapy within 24h of therapy initiation. Patient demographics, past medical history and acuity of illness data will be collected. Patients will be stratified based on the antibiotic they received and patient groups will be compared. Nephrotoxicity will be assessed via the RIFLE (risk, injury, failure, loss, end-stage renal disease) classification. Baseline serum creatinine will be the most recent concentration prior to initiation of antibiotics. Kidney function will be assessed using peak serum creatinine levels during treatment course and up until 7 days after discontinuation. Secondary endpoints include all cause 30-day mortality, length of hospital stay after initiation of antibiotic agent and microbiologic cure rate based on clearance of MDR gram-negative bacilli from cultures and clinical cure based on progress notes. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify the obstacles associated with treating multi-drug resistant Gram negative pathogens

Discuss the nephrotoxicity rates associated with polymyxin B, colistin and aminoglycosides

Self Assessment Questions:

What is the mechanism of aminoglycoside nephrotoxicity?

- A Crystal nephropathy
- B: Tubular cell toxicity
- C: Acute interstitial nephritis
- D: Thrombotic microangiopathy

Which agent does not require renal dose adjustments?

- A Aminoglycosides
- B Colistin
- C Polymyxin B
- D They all require renal dose adjustments

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-624L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATING BLOOD GLUCOSE CONTROL AS AN INDICATOR OF OUTCOMES IN PATIENTS WITH BACTEREMIA

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Purpose: Bacteremia is a significant cause of morbidity and mortality throughout the United States. A wide variety of risk factors for the development of bacteremia exist, including but not limited to diabetes mellitus. Studies have been done investigating the relationship between diabetic patients and their risk for contracting bacteremia, as well as their outcomes based on their initial blood glucose control upon diagnosis. However, studies examining outcomes based on level of control while hospitalized for bacteremia are lacking. This project aims to determine whether well- versus poorly-controlled blood glucose during hospitalization for bacteremia is a factor in overall patient outcomes.

Methods: This retrospective, observational, single-center cohort study examined diabetic patients hospitalized at Saint Joseph East and diagnosed with bacteremia between July 2014 and July 2016. The primary endpoint was thirty day mortality. Secondary endpoints included length of hospital stay, time to de-escalation of antimicrobial therapy, length of antimicrobial therapy, and time to resolution of bacteremia from time of diagnosis. Data was obtained utilizing electronic medical records. Categorical data was evaluated using a chi-squared test (χ^2) and continuous data was evaluated utilizing the Students t-test. An a priori alpha of 0.05 was set for significance. Data analysis was performed using Microsoft Excel and SAS statistical software. These methods have been determined to meet federal exemption criteria by the Catholic Health Initiatives Institutional Review Board.

Results/Conclusions: Final results and conclusions are pending and will

Learning Objectives:

Review definition, epidemiology, and risk factors for bacteremia

Discuss correlation between diabetes and risk of developing a bacteremic infection

Self Assessment Questions:

Which of the following statements regarding bacteremia is correct?

- A Bacteremia is most commonly a spontaneous infection with no id
- B: Empiric antibiotics should not be started until it is confirmed that t
- C: Bacteremia is almost always a hospital-acquired infection
- D: Clinical manifestations of bacteremia may be vague, such as feve

In patients with diabetes, which of the following is a risk factor for developing bacteremia?

- A Frequent episodes of hypoglycemia
- B Requiring treatment with insulin
- C Impaired immune response due to hyperglycemia
- D Both A and C

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-650L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

COMPARISON OF AN EMERGENCY DEPARTMENT-SPECIFIC ANTIBIOGRAM TO HOSPITAL-WIDE ANTIBIOGRAM: INFLUENCE OF PATIENT-SPECIFIC FACTORS ON SUSCEPTIBILITY

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Purpose: The emergence of infections due to multidrug-resistant organisms has a significant impact on patient outcomes. Traditional antibiograms using local resistance patterns and susceptibility data are currently used to guide clinicians in selecting empiric antimicrobial therapy. However, antibiograms are rarely unit-specific and do not aid clinicians in selecting appropriate empiric antibiotic therapy prior to identification of the organism. Traditional antibiograms also fail to account for patient specific factors. These limitations can lead to overuse of broad-spectrum antimicrobials. The purpose of this study is to develop an Emergency Department-specific antibiogram and compare susceptibilities to the hospital antibiogram. The secondary endpoint is to further classify susceptibilities for the most commonly identified organisms based on patient-specific risk factors to facilitate the selection of appropriate antimicrobial therapy and minimize broad-spectrum antimicrobial use. **Methods:** This is a retrospective, single-center descriptive study to compare the susceptibilities of the most commonly occurring organisms isolated from the Emergency Department versus the hospital-specific standard existing antibiogram. Culture reports were identified via ACL Laboratories and TheraDoc between January 2016 through December 2016. The primary objective was to develop an ED-specific antibiogram and compare the susceptibilities of the most commonly identified organisms to the existing hospital antibiogram. The secondary objective was to stratify the susceptibilities in the ED-specific antibiogram based on age, antimicrobial exposure in the past 30 days, hospitalizations in the past 30 days, and patient disposition immediately prior to ED arrival. **Results/Conclusion:** Data collection and analysis are pending and will be presented at the Great Lakes Pharmacy Resident Conference in April.

Learning Objectives:

Describe an antibiogram and its utilization to guide empiric antimicrobial treatment.

Identify advantages and limitations associated with the use of a traditional antibiogram to guide empiric antimicrobial therapy in an emergency department.

Self Assessment Questions:

What is the purpose of antibiogram?

- A Provides recommendations on appropriate de-escalation of antimicrobials
- B Provides clinicians with the susceptibility rates of the most common organisms
- C Discusses the appropriate dosing and duration of therapy of antimicrobials
- D Identifies patient-specific risk factors that affect susceptibilities to antimicrobials

Which of the following options reflects a main limitation to the utilization of a standard antibiogram for empiric therapy selection in an emergency department for a patient being discharged from the

- A Institution specific susceptibility data
- B Susceptibility data for the most common organisms causing infection
- C Unit specific susceptibility data
- D Susceptibility differences within an antimicrobial class

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-517L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

HOSPITAL-ACQUIRED AND VENTILATOR-ASSOCIATED PNEUMONIA: DEVELOPMENT OF A NOVEL CLINICAL DECISION TOOL TO IMPROVE ANTIMICROBIAL UTILIZATION

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Purpose: The purpose of this project is to demonstrate effectiveness of a novel national guideline adaptation method and implementation of a clinical decision support tool to increase guideline adherence and decrease excessive durations of antimicrobial therapy in the setting of hospital-acquired pneumonia (HAP) and ventilator-associated pneumonia (VAP). **Methods:** A retrospective chart review evaluated ICU patients with HAP and VAP over a one month period to assess average duration of antimicrobial treatment. Chart review results demonstrated a need for standardization of care. Adaptation of the 2016 Infectious Disease Society of America (IDSA) HAP/VAP guideline was achieved through an email survey and stakeholder meeting. The electronic medical record (EMR) was leveraged to implement the guideline using disease-specific order panels and antimicrobial order forms, including HAP/VAP. An antimicrobial order form was modified to improve usability, provider satisfaction, and indication documentation after receiving feedback from end-users. Finally, as part of the mechanism to improve antimicrobial utilization, expectations were set for pharmacists to complete documentation of day one of therapy and an expected duration of antimicrobial treatment. **Results:** A retrospective chart review demonstrated that antimicrobial treatment duration is excessive in 46% of ICU patients being treated for HAP/VAP. Physicians agreed to 49% (25 of 51 recommendations) of the 2016 IDSA recommendations survey results before the initial work group meeting to implement a new UW Health specific HAP/VAP guideline. Order panels were created for 13 disease states. Ninety-five percent of surveyed providers did not like the old antimicrobial order form and a new antimicrobial order form presenting indications by category was created with a 70% approval rating. Additional results will be presented at the Great Lakes Residency Conference. **Conclusion:** Conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Identify one method to increase efficiency when working with physicians as part of a large workgroup

Discuss the advantages of having a EMR clinical decision support tool to easily identify antibiotic indications

Self Assessment Questions:

What is an effective method for gathering physician input on guideline recommendations prior to an official workgroup meeting?

- A Cold calling physicians prior to the workgroup meeting
- B Send out surveys prior to the workgroup meeting
- C Nothing. Discuss all recommendations at the workgroup meeting
- D Schedule meetings with all the physicians individually before the workgroup meeting

What is the importance of having accurate antibiotic indications in the EMR for antimicrobial stewardship purposes?

- A Easier to pull data from the EMR retrospectively for research and quality improvement
- B To save the hospital money by reducing medication costs
- C Indications on the form can be used for billing purposes
- D There is no benefit

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-694L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF A FREE HEART FAILURE MEDICATION PROGRAM ON THIRTY-DAY HOSPITAL READMISSION RATES

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Purpose: Approximately 5.7 million adults in the United States have heart failure. Increased readmissions can cause hospitals to receive reduced payments from the Center for Medicare and Medicaid Services (CMS) due to the Hospital Readmissions Reduction Program. One strategy to avoid these penalties would be providing medications (lisinopril, carvedilol, furosemide, potassium chloride) to patients for free since the inability to afford medications upon discharge can lead to decreased medication adherence, which could contribute to readmissions and mortality. The objective of this study is to determine if a free discharge supply of select medications reduces thirty-day readmission rates of heart failure patients discharged from Memorial Hospital of South Bend. **Methods:** Electronic medical records and data from CMS will be examined to complete a retrospective review of patients with the primary diagnosis of heart failure discharged from Memorial Hospital from January 1, 2016 to December 31, 2016, in order to assess the impact of a free heart failure medication program on thirty-day hospital readmission rates. Medications provided to patients from this initiative include lisinopril, carvedilol, furosemide, and potassium chloride extended-release tablets. These medications are filled at the hospital's pharmacy prior to the patient's discharge and are supplied at no cost to the patient. Medications chosen for each patient will be at the discretion of the prescriber. The primary endpoint of this study is all-cause hospital readmission rates thirty days following the patient's discharge from Memorial Hospital of South Bend per CMS. The secondary endpoint is overall heart failure mortality per CMS. This study was approved by Memorial Hospital of South Bend's Institutional Review Board. **Results and Conclusions:** Data collection and analysis are in progress and will be presented at Great Lakes Residency Conference.

Learning Objectives:

Identify heart failure medication classes that have been shown to decrease mortality in clinical trials.

Recall additional disease states in which readmission rates are currently being assessed by CMS.

Self Assessment Questions:

Which of the following medications or medication classes used in the treatment of heart failure has been shown to decrease mortality in clinical trials?

- A Loop diuretics
- B: ACE inhibitors
- C: Aspirin
- D: Digoxin

Which of the following disease states is currently being assessed by CMS for readmission rates?

- A Cellulitis
- B Diabetes mellitus
- C Acute exacerbation of chronic obstructive pulmonary disease
- D Urinary tract infection

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-828L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF A PHARMACIST-RUN SMOKING CESSATION CLINIC ON REDUCTION IN CIGARETTE USE

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Purpose: Cigarette smoking is the primary cause of preventable death and morbidity in the United States and is highly addictive. Given the importance of smoking cessation on patient outcomes, the objective of this study is to evaluate the efficacy of a pharmacist-run smoking cessation clinic. The primary outcome is to determine the rate of cigarette use reduction in patients attending a smoking cessation clinic at a community teaching hospital. **Methods:** This study is a retrospective cohort chart review of patients who attended Mercy Hospitals outpatient smoking cessation clinic between July 2014 and August 2016. Patients were included if they were at least 18 years of age, enrolled in the smoking cessation clinic, and completed two or more counseling visits with a pharmacist. Patients were excluded if they were pregnant or had uncontrolled hypertension, arrhythmias, or other chronic diseases at the time of referral. Data collected included percentage of patients who quit smoking, time to complete smoking cessation, number of visits to stop smoking, and predictive factors for quitting. **Results/Conclusions:** A total of 68 patient charts were reviewed with initial visits ranging from July 18th, 2014 to August 31st, 2016. Cigarette use was reduced by an average of 10.5 cigarettes through the course of clinic visits, and by the last clinic visit patients were smoking an average of 3.8 cigarettes per day. Further analysis is pending and results will be presented at the Great Lakes Pharmacy Conference.

Learning Objectives:

Describe the importance of smoking cessation for health outcomes

Explain the value of a pharmacist-run smoking cessation clinic

Self Assessment Questions:

What does the Faegerstrom Assessment determine for a patient?

- A Severity of nicotine withdrawal
- B: Extent of nicotine dependence
- C: Severity of nicotine-related damage
- D: Extent of nicotine-related patient activities

Which of the following conditions could be caused by smoking?

- A Lung Cancer
- B Chronic Bronchitis
- C Emphysema
- D All of the above

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-649L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF ANTIMICROBIAL USE AND THE IMPACT OF PHARMACIST AND PROVIDER EDUCATION IN THE TREATMENT OF ASYMPTOMATIC BACTERIURIA IN A COMMUNITY TEACHING HOSPITAL

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Purpose: The objective of this study is to assess the impact of education on antimicrobial prescribing practices for patients with asymptomatic bacteriuria (ASB). **Methods:** This retrospective before and after study will compare the number of ASB patients treated in accordance with the Infectious Diseases Society of America (IDSA) guidelines before and after medical staff education led by pharmacy. The primary endpoint is the number of patients with ASB who were treated in accordance with IDSA guidelines. The secondary endpoints include duration of antimicrobial therapy and number of patients discharged on oral antibiotics. The control (before) group will be obtained through a hospital medical record search for adult patients diagnosed with a urinary tract infection or ASB admitted between October 19, 2015 and January 20, 2016. The study (after) group will be obtained through the same process using the dates from October 20, 2016 to January 20, 2017. The study will include three internal medicine services with the same attending physician for both study periods. Education will consist of dissemination of hospital treatment guideline for urinary tract infections and ASB, formal presentations for medical and pharmacy staff, and continued pharmacy intervention throughout the post-study period on medical floors with decentralized pharmacists. Inpatients greater than 18 years of age with a hospital discharge diagnosis of urinary tract infection or ASB will be included. Patients will be excluded if pregnant, history of renal transplant, or undergoing a urological procedure during admission. **Results and conclusions:**

Data collection is currently ongoing. Results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify patient populations with asymptomatic bacteriuria in which antimicrobial therapy is recommended.

Describe possible complications of unwarranted antimicrobial use in patients with asymptomatic bacteriuria.

Self Assessment Questions:

Which of the following patients who present with a positive urine analysis, urine culture (colony forming unit of >100,000 of *E. coli*), and no urinary complaints would you recommend antimicrobial init

- A: 57 year old female with diabetes
- B: 23 year old pregnant female
- C: 86 year old male admitted from a skilled nursing facility
- D: 42 year old female with history of a spinal cord injury

Based on historical data, which of the following patient outcomes may occur due to use of unwarranted antimicrobial therapy in patients with asymptomatic bacteriuria?

- A: Increased risk of urolithiasis
- B: Damage to urinary tract
- C: Increased need for catheterization
- D: Development of *Clostridium difficile* infections

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-622L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF ANTIBIOTIC PRESCRIBING FOR ACUTE UPPER RESPIRATORY TRACT INFECTIONS IN THE AMBULATORY CARE SETTING

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Background Overprescribing of antibiotics, especially in the ambulatory care setting, has caused an increase in antimicrobial resistance among community-acquired bacterial infections worldwide. In 2011, 262 million outpatient antibiotic prescriptions were dispensed globally. A recent study by Fleming-Dutra and colleagues investigated the prevalence of inappropriate ambulatory antibiotic prescriptions over one year in the United States and concluded that 50% of antibiotics prescribed for upper respiratory infections were appropriate. The goal of antimicrobial stewardship is to optimize clinical outcomes and minimize untoward effects through optimal use of anti-infectives. Acute respiratory tract infections (URIs), such as acute sinusitis, pharyngitis, and bronchitis, precipitate significant outpatient prescriptions and are targets for antimicrobial stewardship efforts given they are often of viral origin and do not require treatment with antibiotics. The purpose of this research is to identify baseline information about the proportion of antibiotics prescribed for treatment of these acute URIs in order to improve antimicrobial stewardship efforts in the ambulatory care setting within the University of Illinois Hospital & Health Sciences System (UIH). **Methods** This is a retrospective, observational, cohort study designed to identify the proportion of antibiotics that are being prescribed for the treatment of acute bronchitis, sinusitis, and pharyngitis, during ambulatory care visits at UIH between July 31, 2014 and August 1, 2016. Data to be collected include: patient demographics, medical history, allergies, temperature, culture results, insurance type, and antibiotic prescription and prescriber information. The primary endpoint is the proportion of antibiotics prescribed for the treatment of acute sinusitis, pharyngitis, and bronchitis collectively. Secondary endpoints include: proportion of antibiotics prescribed for the infections independently, appropriateness of antibiotics prescribed, duration of therapy, repeat courses within 30 days, and *Clostridium difficile* infection within 90 days post-antibiotic prescription. **Results/Conclusions**

Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the goals of antimicrobial stewardship programs.

Identify key characteristics of acute upper respiratory tract infections that guide therapeutic treatment options away from the use of antimicrobial agents.

Self Assessment Questions:

Which of the following includes the goals of antimicrobial stewardship programs?

- A: Utilize broad-spectrum antibiotics in all infectious cases
- B: Optimize antimicrobial use to improve clinical outcomes and reduce
- C: Select antimicrobial agents without regard to cost-effectiveness
- D: Optimize antimicrobial therapy without consideration of adverse effects

Which common characteristics of acute upper respiratory tract infections (URIs) would suggest an antibiotic is not necessary?

- A: URIs are of bacterial origin with non-specific symptoms
- B: URIs are of viral origin with high risk of escalation to bacterial blood
- C: URIs are of bacterial origin with low risk of escalation to bacterial blood
- D: URIs are of viral origin with low risk of escalation to bacterial blood

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-581L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PHARMACIST IMPLEMENTATION OF ANTIBIOTIC END DATE IN PATIENTS WITH PNEUMONIA

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Purpose: To evaluate the impact of a new protocol allowing pharmacist to identify, evaluate, and enter an antibiotic end date in stable patients with a physician-determined diagnosis of pneumonia. **Methods:** A retrospective comparative cohort study conducted at Sparrow Hospital. Cohort 1 consisted of patients admitted with pneumonia from November 2015 through March 2016 and was compared to cohort 2, consisting of patients admitted with pneumonia November 2016 through March 2017, reflective of time periods before and after initiation of a new antimicrobial stewardship protocol for pneumonia therapy. Subjects from each group were matched according to severity (ICU vs. non-ICU at time of antibiotic initiation), physician-determined diagnosis (CAP, HCAP, HAP or VAP), and age (5 years). The primary outcome assessed will be the 28-day antibiotic-free days, defined as the total number of days without antibiotic therapy in a 28 day period. Secondary outcomes include hospital length of stay, mortality, readmission rate, inpatient treatment duration, outpatient treatment duration, and total treatment duration.

Summary: Review of 66 patients (33 in each cohort) diagnosed with community acquired pneumonia shows a significant improvement in the primary outcome of 28-day antibiotic free days in patients who had an antibiotic end date entered by the pharmacist compared to those who did not (19.78 days vs. 21.45 days, $p=0.026$). **Conclusions:** Final conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Define the role of the antimicrobial stewardship pharmacist at Sparrow Hospital.

Recognize the impact of a new protocol limiting antibiotic duration in patients with pneumonia.

Self Assessment Questions:

Which of the following is correct regarding the antimicrobial stewardship pharmacist at Sparrow Hospital?

- A: The pharmacist must call the physician to recommend entering an
- B: The pharmacist may enter an end date on antibiotics used to treat
- C: The pharmacist may enter an end date on antibiotics in a patient v
- D: Once an antibiotic end date has been entered by the pharmacist, i

Which of the following best summarizes the findings of the retrospective chart review assessing the impact of pharmacist-implemented antibiotic end dates in patients with pneumonia?

- A: Pharmacist involvement in antibiotic therapy resulted in a significa
- B: Pharmacist involvement in antibiotic therapy resulted in a non-sigr
- C: Pharmacist involvement in antibiotic therapy resulted in a non-sigr
- D: Pharmacist involvement in antibiotic therapy resulted in a significar

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-817L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ANTIBIOTIC PROPHYLAXIS FOR EXTERNALIZED VENTRICULAR DRAINS: A SINGLE CENTER EXPERIENCE LOOKING AT THE RISK OF HOSPITAL ACQUIRED INFECTIONS IN A NEUROSCIENCE INTENSIVE CARE UNIT

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Purpose: Perioperative antibiotic prophylaxis is common practice for neurosurgical procedures performed in a clean environment and has been shown to reduce the rate of postoperative infection. However, following an emergent bedside ventriculostomy and insertion of an external ventricular drain, many institutions will continue antibiotic administration for the full duration of drain placement. This practice is controversial and is not supported by the existing literature. In addition, some evidence suggests this practice is associated with increased risk of developing hospital acquired infections. The purpose of this study is to determine if the incidence of hospital acquired infection differs between patients exposed to external ventricular drain placement with extended prophylactic antibiotic treatment and those not exposed to drain placement following intracranial hemorrhage or traumatic brain injury in a mechanically ventilated patient population. **Methods:** This is a retrospective cohort study investigating the use of antibiotic prophylaxis with external ventricular drain placement in mechanically ventilated patients in a single neuroscience intensive care unit. Electronic medical records were used to collect data, and data from January 1, 2008 to December 31, 2015 were included. Patients that required mechanical ventilation and external ventricular drain placement were identified using ICD-9/10 charge codes. The primary objective is to determine if prophylactic antibiotic use together with external ventricular drains is an independent risk factor for developing non-CNS hospital acquired infection in mechanically ventilated patients in the neuroscience intensive care unit. Data collected include: indication for drain placement, Glasgow coma scale score, Hunt and Hess Classification score, Modified Fisher Scale score, NIHSS Stroke Scale score, duration of drain placement, duration of ventilation, quantity/type of antibiotics administered, type/onset of infection, and hospital/ICU length of stay. The primary objective will be evaluated via multivariable regression modeling. **Results/Conclusions:** Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

State ASHP recommendations for antibiotic prophylaxis in patients with external ventricular drains

Recognize potential risks of extended antibiotic prophylaxis given for placement of external ventricular drains

Self Assessment Questions:

Which of the following is recommended by ASHP for antimicrobial prophylaxis in neurosurgical procedures?

- A: A single dose of cefazolin for patients undergoing clean placemen
- B: Continued antimicrobial prophylaxis for the duration of external ve
- C: ASHP guidelines make no recommendations on the topic of antim
- D: Vancomycin should be used as a first-line option for antimicrobial

Which of the following has been shown in previous literature discussed today to be associated with extended antimicrobial prophylaxis for placement of external ventricular drains?

- A: Decreased rate of CNS infection
- B: Increased rate of pneumonia
- C: Increased rate of CNS infection
- D: Decreased rate of infections caused by multi-drug resistant organi

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-658L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATING THE USE OF AN OPIOID TOLERANCE LEVEL PAIN MANAGEMENT PROTOCOL IN THE ORTHOPEDIC PATIENT POPULATION

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Background/Purpose: Patients with opioid tolerance frequently necessitate higher dosages of opioids to attain adequate pain control. Opioid tolerance has been defined as patients utilizing 60 mg or more of oral morphine equivalents daily for greater than one week. While the Institute for Safe Medication Practices (ISMP) recommends a standardized approach to pain management, there is a lack of strong evidence-based recommendations for a specific protocol. Indiana University Health (IUH) developed an opioid tolerance level pain management protocol for orthopedic surgery patients. The purpose of this study is to evaluate the use of an opioid tolerance pain management protocol in orthopedic surgery patients before and after implementation of a standard pain management protocol at Indiana University Health Methodist Hospital. **Methods:** This is a retrospective chart review of adult patients admitted to the floor or progressive care unit for at least 24 hours at IUH Methodist Hospital between September 2013 and September 2014 for any orthopedic surgery. Patients are excluded if they were admitted to the ICU, less than 18 years old, prisoners, or pregnant. Comparison groups from this study include patients who met inclusion criteria during the time before versus the time after implementation of the opioid tolerance pain management protocol. The primary endpoint is the cumulative opioid dose (in morphine PO equivalents) administered to patients using the pain protocol compared to patients prior to when the intervention took place. Secondary endpoints include concurrent use of additional pain medications, 72 hour perioperative pain scores, naloxone use, and opioid medications prescribed at discharge. **Results:** Data collection is pending and results will be presented at the Great Lakes Pharmacy Resident Conference. **Conclusion:** Data collection is pending and results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify two factors which lead to opioid tolerance

Describe the benefits of a standardized approach to pain management with opioids

Self Assessment Questions:

Which of the following is TRUE regarding why a standardized approach to pain management is recommended?

- A To reduce medication errors
- B To increase variability in opioid prescribing
- C To integrate and coordinate patient care
- D Both A and C

Which of the following is a factor that may lead to a patient developing tolerance to an opioid medication?

- A Decrease in marketing of opioid medications over recent years
- B Acute pain
- C Over-prescribing of opioid medications
- D Adequate tapering of patients

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-795L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF A PHARMACIST-DRIVEN SLIDING-SCALE INSULIN DOSING PROTOCOL ON GLYCEMIC CONTROL IN MEDICAL INPATIENTS AT A COMMUNITY TEACHING HOSPITAL

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Purpose: To evaluate the impact of a pharmacist-driven sliding-scale insulin dosing protocol on improving glycemic control in hospitalized non-ICU patients. **Methods:** This is a single-center, retrospective, quality improvement, before and after pilot study. Data will be extracted from the electronic medical records for the time period of 3 months pre and post pharmacist intervention. Pre-implementation data will be collected from December 1, 2015 to February 29, 2016 and compared to post implementation data collected from December 1, 2016 to February 28, 2017. Patients will be included if they were ≥ 18 years old, managed on internal medicine floors with clinical pharmacist coverage, had a length of stay ≥ 72 hours, and had two consecutive blood glucose readings ≥ 25 mg/dL within 24 hours. Primary endpoints will evaluate both safety and efficacy defined by the number of hypoglycemic events and change in mean random blood glucose values after pharmacist intervention, respectively. Secondary endpoints will include the number of patients continued on oral diabetic medications upon admission, number of oral hypoglycemic agents continued upon admission, and mean blood glucose values in patients on high-dose corticosteroids. **Results:** Data collection and analysis is ongoing. Final results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the guideline recommended therapy for glycemic control in hospitalized non-ICU patients.

List potential or perceived barriers to glycemic control in hospitalized patients.

Self Assessment Questions:

According to the ADA/AACE guidelines, what is the recommended therapy for glucose control in hospitalized non-ICU patients?

- A Sliding-scale insulin
- B Basal-bolus therapy
- C IV insulin
- D Basal-bolus and supplemental sliding-scale insulin

What is the most significant reason for hyperglycemia in hospitalized patients?

- A Decreased nutritional intake
- B Fear of hypoglycemia
- C IV antibiotics
- D Discontinuation of oral diabetic medications upon hospital admission

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-482L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

RETROSPECTIVE EVALUATION OF THE OUTCOMES AND DURATION OF ALENDRONATE THERAPY AT THE JESSE BROWN VA MEDICAL CENTER

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Purpose: Osteoporosis is the most common bone disease in the world and is characterized by low bone mineral density (BMD), decreased bone strength, and increased fracture risk. Osteoporosis-related fractures and the associated complications result in increased disability, morbidity and mortality, and healthcare costs. Oral bisphosphonates are guideline recommended treatments for high risk patients to increase bone mineral density and decrease fractures. Although oral bisphosphonates have demonstrated the ability to increase BMD in clinical trials with men, there are limited data to demonstrate that oral bisphosphonates reduce fracture incidence in men. Additionally, in real world settings, oral bisphosphonate non-compliance rates are high, which may negatively impact treatment efficacy. At the Jesse Brown VA Medical Center, where the majority of patients are male, alendronate is the preferred oral bisphosphonate. The purpose of this study is to evaluate the incidence of osteoporosis-related fractures in compliant and non-compliant patients treated with alendronate. **Methods:** This was a retrospective, electronic chart review of patients who newly initiated alendronate between September 1, 2005 and August 31, 2015. Subjects who received a prescription for alendronate during the study period were identified from a report generated from the Computerized Patient Record System (CPRS). The primary endpoint was the osteoporosis-related fracture incidence in patients compliant with alendronate therapy compared to that of non-compliant patients. Secondary endpoints included: fracture incidence comparisons based on treatment duration, gender, age, and drug holiday use; change in T-score; adverse drug reactions; and monitoring. **Results/Conclusions:** Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss guideline recommendations for the treatment of osteoporosis
Describe barriers to compliance with oral bisphosphonates

Self Assessment Questions:

Identify which of the following medications is recommended by the 2012 Endocrine Society clinical practice guideline for male patients at high fracture risk:

- A Calcitonin
- B: Ibandronate
- C: Alendronate
- D: Teriparatide + risedronate

Which of the following is/are reason(s) patients may be non-compliant with oral bisphosphonate therapy?

- A Daily dosing
- B Gastrointestinal adverse events
- C Administration requirements
- D All of the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-498L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION OF MEDICATION EDUCATION PROVIDED BY A PHARMACIST IN HEART FAILURE, MYOCARDIAL INFARCTION, AND ARRHYTHMIA PATIENTS

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Purpose: A treatment gap exists for a large proportion of patients admitted for heart disease. Readmission is often preventable through appropriate medication use and effective discharge instructions. Providing quality counseling to the patient at discharge is critical in order to optimize outcomes. Pharmacists have a unique role in patients with heart disease, given the importance of treatment with evidence-based, mortality-lowering medication therapies. The purpose of this study is to implement pharmacist provided one-on-one direct medication education to patients admitted for myocardial infarction, heart failure, and arrhythmia. To be specific, the impact on patient satisfaction scores, readmission rates, and patient knowledge will be evaluated. **Methods:** This is a prospective, non-randomized, intervention study. The Institutional Review Board at St. Joseph Mercy Oakland approved this study. Patients included in the study are those who have a diagnosis of heart failure, myocardial infarction, or arrhythmia and will be discharged on new medications related to these disease states. These patients will receive a knowledge assessment, pharmacist-provided medication education regarding their new cardiovascular medications, and a five day follow up call to repeat the knowledge assessment. The primary endpoint is patient satisfaction scores, which will be assessed through the Hospital Consumer Assessment of Healthcare Providers and Systems Survey (HCAHPS) scores. The secondary endpoints to be assessed are improvement of patient knowledge, and readmission within 30 days of discharge. A historical control group will be used to assess patient satisfaction scores and readmission rates pre- and post-intervention. **Results/Conclusions:** Data collection and analysis is ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify factors that contribute to early readmission in patients with heart disease.

Discuss key components of medication education at discharge.

Self Assessment Questions:

Which of the following factors has been shown to contribute to early readmission rates in patients with heart disease?

- A High degree of health literacy
- B: Adequate discharge planning
- C: Nonadherence to drug therapy
- D: No other comorbidities

Which of the following is the correct reading level written education materials should be no higher than?

- A A third-grade reading level
- B A fourth-grade reading level
- C A fifth-grade reading level
- D A sixth-grade reading level

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-338L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ASSESSMENT OF PHARMACIST INTERVENTIONS ON GLYCEMIC CONTROL FOR PATIENTS WITH DIABETES MELLITUS AND COMORBID DEPRESSION

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Purpose: It is estimated that up to 30% of patients with diabetes also have comorbid depression. There is no current literature evaluating pharmacist initiated screening for depression in patients with diabetes in order to identify depression and decrease patient burden for both disease states within the primary care setting. The objective of this study is to assess the impact a new outpatient pharmacy service has on glycemic control when screening for depression, making interventions in both diabetes and depression medication, and coordinating care for patients that need further assessment by a behavioral health provider.

Methods: A new pharmacy service for depression management was implemented on October 1, 2016 into the already established diabetes management service in a primary care office within a Federally Qualified Health Center. Patients referred are assessed for proper medication management and screened for possible depression if adherence or self-care issues are suspected. If depression is identified or not properly controlled, a patient will be referred to the on-site behavioral health counselors for assessment and coordination of care to a behavioral health center. Patients referred to the clinic with known comorbid diabetes and depression will have pharmacist-directed medication interventions where appropriate. Submission for exempt Institutional Review Board research status will be completed in March, 2017 to request approval to conduct a 6-month retrospective chart review for referred patients from October 1, 2016-March 1, 2017. Descriptive statistics will be used to characterize both the primary outcomes of changes in patient hemoglobin A1c percentages and Patient Health Questionnaire (PHQ) 9 scores from referral to the conclusion of the study, and secondary outcomes including a summary of pharmacist interventions, patient demographics, other chronic disease states for each patient, and patient self-reported total number of chronic disease medications. **Results and Conclusions:** Will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the PHQ-9 as an assessment tool in screening patients for depression.

Outline the lifestyle modifications recommended for patients with diabetes from the American Diabetes Association Treatment Guidelines

Self Assessment Questions:

Which of the following are true regarding the use of the PHQ-9 as a screening assessment tool for depression?

- A Tool can be used to aid in diagnosing, monitoring and measuring
- B: Tool can be used at multiple patient encounters to assess depression
- C: Scores of ≥ 10 can indicate a patient is experiencing major depression
- D: All of the above

Which of the following are lifestyle modifications recommended by the American Diabetes Association for patients with diabetes mellitus?

- A 50 minutes of moderate intensity exercise per week
- B Diets of less than 30 grams of carbohydrates per day
- C In obese or overweight patients, a reduction of 5% of total body weight
- D Flexibility training

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-913L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF INITIAL UNFRACTIONATED HEPARIN DOSING IN PATIENTS WITH A THERAPEUTIC INTERNATIONAL NORMALIZED RATIO (INR)

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Purpose: Unfractionated heparin is widely used as an anticoagulant for thrombotic disease as well as specific cardiac indications. While multiple standardized protocols have been developed for unfractionated heparin dosing, no standardized method of dosing patients with an already therapeutic INR exists. Henry Ford Macomb Hospital has utilized a pharmacist-driven heparin dosing protocol since 1991. This protocol, which was in effect until October 2014, required an initial dose reduction in patients with a therapeutic INR (i.e., INR above 2) in order to reduce the risk for bleeding. Specifically, the dose was reduced to a standard rate of 450 units/hr. In October 2014, the protocol rate was changed to "half the recommended rate for the indication." This study was conducted to evaluate our current heparin dosing in patients with a baseline therapeutic INR and to compare it to our previous protocol. The goal was to evaluate which protocol provided the most consistently therapeutic initial PTTs and to determine if either protocol showed a significant risk for bleeding. **Methods:** The study was approved by the systems institutional review board before initiation. A retrospective chart review was conducted at Henry Ford Macomb Hospital. All patients with a therapeutic INR before initiating heparin that were dosed from December 2013 to November 2015 were reviewed for inclusion in the study. Primary outcome evaluated will be therapeutic first PTTs in each group. Bleeding rates will be evaluated as a secondary outcome. **Results/Conclusions:** Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the pharmacokinetics and pharmacodynamics of unfractionated heparin.

Discuss the risks versus benefits of a reduced dose unfractionated heparin protocol in patients with therapeutic INR.

Self Assessment Questions:

Current literature supports which of the following heparin dosing regimens in patients admitted with a therapeutic INR (i.e., INR above 2):

- A Heparin 5,000 units bolus then $\frac{1}{2}$ the normal rate
- B: Full heparin bolus (based on the protocol) then 1,000 units/hr
- C: No bolus but double the expected heparin rate
- D: There is no literature to support a specific dosing regimen in such

Lowering the initial rate of IV heparin for a patient with a therapeutic INR may be considered because:

- A The patient may be at an increased risk for bleeding
- B The patient may be at an increased risk for developing HIT
- C The patient may be at increased risk for warfarin-induced skin necrosis
- D The patient may be at increased risk for burning or irritation at the

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-656L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF IMMUNIZATION PRACTICES IN POST-ALLOGENEIC HEMATOPOIETIC TRANSPLANTATIONS AT THE INDIANA BLOOD AND MARROW TRANSPLANT PROGRAM

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Purpose: To prepare patients for allogeneic hematopoietic cell transplants (HCT), a regimen consisting of myeloablative, nonmyeloablative, or reduced intensity chemotherapy is utilized to eliminate lingering cancerous cells before infusing donor cells. Consequently, a depletion of memory B and T lymphocytes results in the loss of immunity acquired over a recipient's lifetime, with limited immunity passed from donor to recipient during transplant. If timely revaccination after an allogeneic HCT does not occur, antibody titers decline markedly. The degree of immunosuppression in a HCT recipient depends upon factors including active graft versus host disease (GVHD), immunosuppressive agents administered, disease burden, and host-specific factors. As such, immunocompromised recipients are susceptible to infections that can rapidly become life-threatening, explaining why revaccination remains a crucial step in reducing morbidity and mortality associated with infections after transplants. The American Society for Blood and Marrow Transplantation has developed vaccination guidelines for preventing infectious complications among HCT recipients. At Indiana Blood and Marrow Transplantation (IBMT), vaccination protocols for allogeneic HCT patients were developed to mirror the 2009 guidelines. The primary objective of this study is to evaluate vaccination rates among IBMT patients at six and twelve months post HCT. The secondary objectives are to evaluate differences in immunization rates with respect to specific types of vaccines administered per IBMT protocol and to explore variables affecting revaccination practices. **Methods:** This is a retrospective cohort of 143 IBMT patients ≥ 18 years of age alive at the 6-month follow-up (Day +180) post HCT. Data was collected from patient charts during the study period of June 1, 2011 through June 1, 2016 and included types and frequencies of vaccines administered and patient-specific variables affecting whether a vaccine was given. **Results/conclusions:** Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss vaccination guidelines for preventing infectious complications among HCT recipients
Review factors and barriers affecting vaccination strategies among HCT recipients

Self Assessment Questions:

What is the earliest time frame consensus guidelines recommend initiating vaccinations after an allogeneic transplant?

- A 3-6 months
- B 6-12 months
- C 18-24 months
- D 24-30 months

Which of the following statements regarding barriers to vaccination strategies is correct?

- A In the case of a HepB vaccine shortage, it is recommended to skip
- B Patient financial constraints can delay the timely administration of
- C Use of corticosteroids, regardless of dose, is a contraindication for
- D Patients with chronic graft-versus-host disease (GVHD) are ineligible

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-823L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EPIDEMIOLOGY AND OUTCOMES OF CULTURE POSITIVE MDR GNB IN LUNG AND LIVER TRANSPLANT POPULATION

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Purpose: Infections from multi-drug resistant (MDR) Gram-negative bacteria (GNB) are associated with high morbidity and mortality. Antibiotic use is a risk factor for developing infections with MDR pathogens. This is relevant in transplant population as they are immunosuppressed and receive more antibiotics. Specifically, in the lung and liver transplant population, there is a significant gap in the literature regarding risk factors associated with developing MDR GNB infections. The objective of this study was to describe the prevalence and antibiotic use associated with MDR GNB infections in this population at Henry Ford Health System (HFHS). **Methods:** This is an IRB approved, retrospective cross-sectional study that included patients listed as liver or lung transplant candidates between January 2010 and July 2016. Inclusion criteria are: age > 18 years and non-pregnant. Patients are excluded if they received multi-organ involving small bowel, heart, or pancreas or a transplant at a non-HFHS institution. Patient specific parameters and antibiotic history 90 days prior to end of time at risk will be collected. Comorbidities are assessed via Charlson Comorbidity index, Model for End-Stage Liver Disease score for those on the liver transplant list, and Lung Allocation Score for those on the lung transplant list. The primary variable of interest is the difference in the cumulative antibiotic exposure within each group during time at risk. This is assessed via a case-case-control study design. Cases represent patients with a positive culture for MDR- and non-MDR GNB. Controls remained negative for GNB during time at risk. Time at risk for infection is clearly defined for all groups. Variables found to have P-values < 0.2 from bivariate analysis or deemed to be clinically relevant a priori will be eligible for inclusion into multivariable logistic regression in order to determine independent associations with outcome. **Results/conclusions:** to be presented at Great Lakes Conference.

Learning Objectives:

Describe the prevalence and impact of MDR GNB infection/colonization in the lung and liver transplant population
Identify risk factors associated with the development of MDR GNB infection

Self Assessment Questions:

What are the predominant organisms associated with infection or colonization in the lung and liver transplant population?

- A Pseudomonas species
- B Acinetobacter species
- C Enterobacteriaceae
- D Achromobacter species

What is a significant risk factor for developing MDR GNB infections?

- A Prior antibiotic exposure
- B Emergency room visits
- C Diabetes mellitus
- D Chronic kidney disease requiring dialysis

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-672L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PROTON PUMP INHIBITOR USAGE AND RISK STRATIFICATION IN A LARGE COMMUNITY TEACHING HOSPITAL

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Purpose: Proton pump inhibitors have consistently ranked among the top twenty most prescribed medications globally for the past five years despite the lack of guideline updates regarding their usage. Due to increasing awareness of proton pump inhibitor associated side effects, it is essential to evaluate current prescribing patterns and implement process improvement strategies to ensure appropriate use. The purpose of this study is to determine if proton pump inhibitors are being utilized appropriately at Bronson Methodist Hospital (BMH), and to implement order modifications to combat inappropriate usage. **Methods:** This study is a retrospective chart review analyzing patients with a proton pump inhibitor on their medication profile. Patients found to have any medications in this class will be evaluated for appropriate usage. Following the initial data collection period, order modifications in the EPIC order entry system will be made in order to decrease inappropriate usage. A second data collection period will occur after this time to determine effectiveness of the order modification. The primary outcome of this study is to retrospectively determine the mean percentage of patient-days of inappropriate proton pump inhibitor therapy during admission to the hospital based upon documented diagnosis and risk factors before and after implementation of use criteria in EPIC for SUP. Secondary outcomes are to assess the number of patients inappropriately continued on proton pump therapy at discharge, evaluate hospital readmissions/primary care visits following proton pump inhibitor initiation for therapy related adverse effects, determine the number of patients developing pneumonia or Clostridium difficile while admitted to hospital following proton pump inhibitor initiation, and to assess the potential economic impact of reduction in PPI usage. **Results/Conclusion:** Data collection and analysis are currently in progress. Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Define appropriate usage of proton pump inhibitor therapy for stress ulcer prophylaxis.

Discuss potential side effects associated with usage of proton pump inhibitor therapy.

Self Assessment Questions:

Which of the following would appropriately qualify a patient for stress ulcer prophylaxis?

- A: ICU patient on day 5 of admission with INR of 1.4 and platelet count
- B: Patient at 24 hours of mechanical ventilation with history of GI bleed
- C: ICU patient on day 5 of admission receiving hydrocortisone 50mg
- D: ICU patient recently extubated with remote history of GI bleed

Which of the following is a potential adverse effect associated with short-term proton pump inhibitor usage?

- A: Clostridium difficile infection due to increased acidic environment
- B: Thrombocytopenia
- C: Prolongation of the QTc interval due to hypomagnesemia
- D: Hip and spine fractures

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-421L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ASSESSMENT OF QSOFA IN THE INITIAL EVALUATION OF PATIENTS WITH SUSPECTED INFECTION

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Purpose: The Third International Consensus Definitions for Sepsis (Sepsis-3) revised the definition of sepsis to include an assessment of organ dysfunction with the sepsis-related organ failure assessment (SOFA) score. The authors also devised an abbreviated quick SOFA (qSOFA) scoring system to identify patients with suspected infection at risk for poor outcomes. Previous sepsis definitions emphasized inflammation, with the systemic inflammatory response syndrome (SIRS) criteria being a key component of the evaluation of patients with suspected infection. The purpose of this research is to compare qSOFA and SIRS in the initial assessment of potentially infected patients.

Methods: This is a retrospective, observational cohort study of adult patients presenting to the emergency department with suspected infection, as identified by the presence of orders for blood cultures, between January 1, 2014 and January 1, 2016. Patients will be identified by a query of microbiology orders and data will be extracted from the electronic medical record. Patients already receiving antibiotics for previously diagnosed infection will be excluded. Patients will be evaluated for their highest qSOFA and SIRS criteria score within 6 hours of the order for blood cultures, and classified according to qSOFA positivity (2 of 3 criteria) and SIRS positivity (2 of 4 criteria). The primary endpoint is the incidence of microbiologically-confirmed infection. Secondary endpoints include the concordance of SIRS and qSOFA positivity, the incidence of SEPSIS-3 defined sepsis and septic shock, and progression to critical illness. **Results and conclusions:** Data analysis is ongoing and results will be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

List the components of quick sepsis-related organ failure assessment (qSOFA) score and systemic inflammatory response syndrome (SIRS) criteria.

Explain the role of SOFA and qSOFA according to the SEPSIS-3 guidelines.

Self Assessment Questions:

Which of the following is NOT a component of qSOFA?

- A: Respiratory rate
- B: Altered mentation
- C: Temperature
- D: Systolic blood pressure

What is the purpose of the qSOFA score according to the SEPSIS-3 Guidelines?

- A: To identify patients at highest risk of sepsis related-mortality
- B: To identify potentially septic patients
- C: To determine which patients need antibiotics
- D: To determine which patients to admit to the hospital

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-843L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PERCEIVED BARRIERS TO RECOMMENDED IMMUNIZATIONS AMONG ADULT PATIENTS

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Purpose: The purpose of this research study is to identify and describe patient perceived barriers to receiving recommended immunizations. Identification of these barriers will better position healthcare providers to assist their patients in overcoming these challenges.**Methods:** Study participants are adults 18 years of age and older recruited from an ambulatory care clinic. The clinic is housed within an independent pharmacy located in a metropolitan area in the Midwestern United States. Focus groups will be conducted with participants to identify themes of patient reported barriers to receiving recommended immunizations. Participants will be assigned to one of four focus groups based upon their age, as immunization needs vary by age. There will be a maximum of twelve participants in each group. A facilitator guide was created based on the framework of Andersens Behavioral Model of Health Services Uses. This model believes health status (receipt of recommended immunization) is influenced by the patients environment, population characteristics and health behavior. Each focus group will have a notetaker present, be audio recorded and then transcribed. Qualitative data analysis will be supported with the use of MAXQDAv.12 software to determine themes across and within our sample. Themes reported in the literature with other patient populations will initially be used to create the code book which will then be adapted as necessary. An audit trail will accompany the code book to document any changes. Two investigators will independently code the responses from each focus group prior to reconciling the codes. Recruitment will begin once approval of the application to use human subjects as research by the Institutional Review Board occurs.**Results:** The results of this study are pending.**Conclusions:** At the conclusion of the study, it is anticipated that the results will support pharmacists in their public health role and facilitate successful immunization interventions.

Learning Objectives:

Identify patient-perceived barriers to receiving immunizations from previous literature and this study

Describe the study design for utilizing focus groups in a qualitative research study

Self Assessment Questions:

Previous literature reported which of following as a potential barrier to a patient receiving a recommended immunization?

- A Having regular healthcare provider visits with open communication
- B Insurance covering the full cost of the immunization with no out of pocket
- C Receiving unbiased information about the immunization from the provider
- D The fear of potential side effects after receiving the immunization

Which of the following statements is true?

- A HealthyPeople 2020 does not have a goal related to immunization
- B HealthyPeople publishes objectives every 10 years focused on immunization
- C Immunization in adults are one of the least cost-effective clinical practices
- D In the United States, immunization rates for adults are higher than for children

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-726L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DEVELOPMENT OF A SCREENING TOOL TO DIRECT OUTPATIENT TREATMENT OF DVT IN ED PATIENTS

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Purpose: To design and implement a standardized screening tool for the identification of patients presenting to the emergency department (ED) at a community hospital with deep vein thrombosis (DVT) as appropriate for outpatient treatment.**Methods:** This study was conducted in three sequential phases: compilation and vetting of screening criteria, evaluation of criteria through retrospective chart review and quantification of potential cost savings, and implementation and operationalization of criteria within an ED-based screening protocol. During phase II, a retrospective chart review was completed to determine the percentage of patients admitted during a 6-month period for treatment of DVT that would have qualified for outpatient therapy had the screening criteria developed during phase I been applied. Cost savings were calculated based on length of hospital stay for admitted patients identified as candidates for outpatient DVT treatment. Further analysis attempted to identify specific areas for process improvement in triaging patients for ambulatory management of DVT by determining the percentage of patients failing to qualify for outpatient therapy stratified by reason. Preliminary outcomes and feasibility data were assessed via 30-day readmission rates for bleeding or clotting events and patient prescription insurance status. Phase III of the study will involve approval of the screening tool and incorporation of a protocol into ED pharmacist workflow.**Preliminary Results:** The majority of patients reviewed would not have qualified for outpatient DVT treatment based on the screening tool developed in this study. The most frequent disqualifying criterion was antithrombotic therapy prior to admission.**Conclusions:** The criteria developed in this study for use in a screening tool to direct outpatient DVT treatment in ED patients may need to be reassessed in order to maximize the number of appropriate patients captured and unnecessary inpatient admissions avoided. Final results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize patient characteristics predictive of successful outpatient DVT treatment.

Identify and assess appropriateness of pharmacological agents for outpatient DVT treatment.

Self Assessment Questions:

Which of the following patients would be appropriate for outpatient DVT treatment?

- A 86 year-old female with a BP of 144/68 mm Hg and history of Factor V Leiden
- B 37 year-old male weighing 72 kg on active treatment for metastatic cancer
- C 50 year-old male with a creatinine clearance of 88 ml/min and no other comorbidities
- D 62 year-old female with a history of atrial fibrillation normally anticoagulated with warfarin

Which of the following anticoagulant regimens would not be appropriate for outpatient treatment of DVT?

- A Apixaban 10 mg po BID x 7 days, then 5 mg po BID x 3 months.
- B Dabigatran 75 mg po BID x 1 week, then 150 mg po BID x 6 months
- C Rivaroxaban 15 mg po BID x 3 weeks, then 20 mg po daily x 3 months
- D Enoxaparin 1 mg/kg q12 hrs plus warfarin x 5-7 days, then warfarin monotherapy

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-691L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

CAN A MICROBIOLOGY COMMENT IMPROVE BROAD SPECTRUM ANTIMICROBIAL PRESCRIBING INERTIA?

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Purpose: For many inpatient pharmacists, suggesting de-escalation of broad spectrum antimicrobials is part of their daily routine, but many physicians remain apprehensive about de-escalation and fail to act on negative cultures due to lack of confidence in microbiology reporting. In May 2016, a change in microbiology reporting on respiratory cultures growing commensal flora only was implemented at our institution to highlight the absence of *Staphylococcus aureus* and *Pseudomonas aeruginosa*. The purpose of this study was to evaluate if this change in microbiology reporting reduced the days of antimicrobial therapy targeted towards methicillin-resistant *Staphylococcus aureus* (MRSA) and *Pseudomonas aeruginosa* after culture finalization. **Methods:** This was an IRB approved, retrospective, quasi-experimental study conducted at a four hospital health system. Patients admitted August 1, 2015 through January 31, 2016 and August 1, 2016 through January 31, 2017 were included if they were at least eighteen years old, had a respiratory culture growing commensal flora only, and were on antimicrobial therapy targeted towards MRSA and *Pseudomonas aeruginosa* for treatment of a respiratory tract infection. Patients were excluded if they had a non-respiratory tract infection. The primary outcome was the proportion of antimicrobial days targeted towards MRSA or *Pseudomonas aeruginosa* after final respiratory culture reporting. Secondary outcomes included length of hospital and intensive care unit stay, time to de-escalation of antimicrobials, and switch from intravenous to oral antimicrobials. Safety outcomes included incidence of acute kidney injury, *Clostridium difficile*, multi-drug resistant organism positive cultures, and in-hospital all-cause mortality. 210 patients will be collected to provide 85% power to detect a 20% difference in the primary outcome. Appropriate statistical analyses will be used to evaluate outcomes, and a binary logistic regression analysis will be used to assess variables that may have influenced outcomes. **Results and Conclusions:** Will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the Infectious Disease Society of America's current recommendations on de-escalation of broad spectrum, empiric antimicrobial therapy for hospital acquired pneumonia.

Select the outcome a comment on respiratory cultures had on days of broad spectrum antimicrobial therapy after culture finalization.

Self Assessment Questions:

When do the Infectious Disease Society of America's guidelines for hospital acquired pneumonia recommend de-escalation of broad spectrum, empiric antimicrobial therapy?

- A: Antimicrobial therapy should never be de-escalated in this patient
- B: Antimicrobial therapy should only be de-escalated in patients with
- C: Antimicrobial therapy should be de-escalated in patients growing r
- D: Antimicrobial therapy can be de-escalated in patients that are clini

Which outcome did a comment on respiratory cultures have on days of broad spectrum antimicrobial therapy after culture finalization?

- A: No change in days of broad spectrum antimicrobial therapy
- B: Increased days of broad spectrum antimicrobial therapy
- C: Decreased days of broad spectrum antimicrobial therapy
- D: The study was not powered to detect a difference in this outcome

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-766L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

UTILIZATION OF ORAL TARGETED THERAPIES AMONG VETERANS WITH STAGE IV OR RECURRENT RENAL CELL CARCINOMA: SUBGROUP ANALYSIS FROM THE RICHARD L. ROUDEBUSH VA MEDICAL CENTER

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Purpose: Surgical resection is the primary treatment for renal cell carcinoma (RCC) in patients with stages I-III disease, and it has a role in patients with stage IV disease. In addition, a number of therapies have become available over the last 10 years for the treatment of relapsed or stage IV disease, including seven oral agents. Utilization patterns have been published in the United States (US), but have not focused on Veterans. Veterans are likely to have more comorbidity, which may translate to the use of different agents, lower doses, shorter durations of treatment, and poorer overall survival than what has been published in clinical trials. There are data to suggest that reduced dosages of oral agents are less effective in the treatment of metastatic RCC. Knowledge of treatment patterns in Veterans with stage IV or recurrent RCC may provide insight into areas for improvement, such as sequencing of therapy and dosing. The overall aim of the study is to describe the use of oral molecularly targeted therapies in the treatment of Veterans with stage IV or recurrent clear cell renal cell carcinoma. **Methods:** This will be a retrospective cohort study of patients with a diagnosis of stage IV or recurrent clear cell RCC between Fiscal Year 2010 and Fiscal Year 2014 at Richard L. Roudebush Veterans Administration (VA) Medical Center. Results from this study will be pooled with drug utilization data from other VA medical centers throughout the US to further assess national VA prescribing patterns. The local cancer registry will be used to identify patients. The electronic medical record and administrative databases will be used to collect data on demographics, comorbidities, systemic therapy, adverse drug events, and outcomes. **Results and Conclusions reached:** Results and conclusions are pending and will be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify oral agents used in the treatment of clear cell renal cell carcinoma.

Discuss patient-specific factors that may impact treatment choices for clear cell renal cell carcinoma.

Self Assessment Questions:

Which of these medications would be an appropriate recommendation for use in metastatic clear cell renal cell carcinoma?

- A: Palbociclib
- B: Pazopanib
- C: Pomalidomide
- D: Ponatinib

Veterans are likely to have multiple comorbidities which may lead to which factor that is associated with less effective treatment of metastatic renal cell carcinoma?

- A: Consistent utilization patterns to predict treatment response
- B: Increased access to health care resources
- C: Reduced doses of oral agents
- D: Improved medication compliance

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-324L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

THE EFFECT OF CONCOMITANT ACID SUPPRESSION THERAPY WITH ERLOTINIB IN NON-SMALL CELL LUNG CANCER

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Purpose: Drug-drug interactions may have a potentially negative impact on clinical outcomes. The dramatic increase in oral oncolytic therapy, including tyrosine kinase inhibitors (TKIs), has led to the observation of drug interactions with other commonly utilized medications such as proton pump inhibitors and histamine-2 receptor antagonists. These acid reducing agents are known to decrease TKI absorption with limited data on clinical outcomes. The pharmacokinetic interaction is documented in the prescribing information that accompanies tyrosine kinase inhibitors, but is largely disregarded by medical oncologists. This study is focused on the interaction between a specific TKI, erlotinib, and concomitant acid suppression therapy in patients with non-small cell lung cancer. The aim is to determine if concomitant use negatively impacts clinical outcomes. **Methods:** From 2004 to 2016, patients in the state of Indiana receiving erlotinib therapy for non-small cell lung cancer were retrospectively reviewed. Demographic information was collected as well as duration of therapy, number of prior treatments, performance status, date of diagnosis, smoking status, stage, histology, genomic testing, response to therapy, overall survival, and date of death. Survival outcomes were compared between groups of patients who received concomitant acid suppression therapy and those who did not.

Results: Data collection is in progress and will be presented
Conclusions: Results are pending and will be presented

Learning Objectives:

Recognize the interaction between acid suppressing agents and tyrosine kinase inhibitors

Review existing pharmacokinetic data regarding acid suppression and tyrosine kinase inhibitors

Self Assessment Questions:

At what pH is erlotinib maximally absorbed?

- A: 2
- B: 4
- C: 6
- D: 8

Which of the following reduce absorption of erlotinib?

- A: NSAIDs and H2RAs
- B: NSAIDs and PPIs
- C: Cigarette smoking and PPIs
- D: Cigarette smoking and NSAIDs

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-617L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PREDICTORS FOR REQUIRING REINDUCTION CHEMOTHERAPY IN ACUTE MYELOID LEUKEMIA PATIENTS WITH RESIDUAL DISEASE ON DAY 14 BONE MARROW ASSESSMENT

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Purpose: Following 3+7 induction chemotherapy in AML, the National Comprehensive Cancer Network and European LeukemiaNet

recommend performing a bone marrow biopsy around day 14 to assess treatment response. For AML patients with inadequate blast reduction (blasts >5-10%), a second course of chemotherapy is immediately recommended. Given the poor predictive value of day 14 bone marrow assessment, many patients are not immediately re-induced and still achieve complete remission without further therapy. The objective of this study is to optimize the predictability of a day 14 bone marrow assessment by identifying risk factors for failure to achieve CR in patients receiving 3+7 induction chemotherapy. **Methods:** Patients with AML who have undergone 3+7 induction chemotherapy at the University of Michigan Health System from January 2000 to September 2016 will be screened for inclusion in this study using the electronic medical record and leukemia database. Patients with positive bone marrow biopsies on day 14 (defined as >5% blasts) who do not undergo re-induction chemotherapy based on this day 14 bone marrow biopsy result will be identified. These patients will then be divided into two cohorts based on whether or not complete remission was achieved upon count recovery (CR and No-CR cohorts). The following data will be collected: patient age, gender, type of AML (de novo, treatment related, secondary to an antecedent hematologic disorder), WBC count at presentation, anthracycline dose, cytogenetics and microarray results, molecular mutations, bone marrow blast percentage at diagnosis and on day 14, peripheral blood blast percentage at diagnosis, bonemarrow cellularity at diagnosis and on day 14, and LDH at diagnosis and on day 14. Rate of peripheral blast clearance will be calculated. **Results/Conclusions:** Will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize the importance of definitive differentiation for reinduction chemotherapy following standard induction chemotherapy in AML.

Describe the risk factors that may indicate failure to achieve complete remission in patients with positive day 14 bone marrow biopsies following standard induction chemotherapy.

Self Assessment Questions:

Positive day 14 bone marrow biopsies (according to current NCCN guideline definitions) are _____ predictive of failure to achieve complete remission following induction chemotherapy?

- A: Highly
- B: Not
- C: Always
- D: Never

The ability to clearly delineate by day 14, patients who should and should not receive immediate reinduction chemotherapy, following a positive day 14 bone marrow biopsy is important for which of the

- A: To avoid unnecessary toxicities of re-induction chemotherapy
- B: To avoid inappropriate delays in potentially curative therapy
- C: To decrease costs associated with treatment
- D: A & b

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-336L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

COMPARISON OF SATISFACTION OF PATIENTS ON WARFARIN WHO MAINTAINED A 12-WEEK INR FOLLOW-UP INTERVAL VERSUS PATIENTS ON DIRECT ORAL ANTICOAGULANT THERAPY

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Statement of the Purpose: The 2012 American College of Chest Physician guidelines suggest an international normalized ratio (INR) follow-up interval of up to twelve weeks in patients on stable doses of warfarin. Both the extension of the INR follow-up interval and use of a direct oral anticoagulant (DOAC) are strategies thought to improve a patients experience with anticoagulation due to decreased monitoring burden. The pharmacist-run anticoagulation clinic at the William S. Middleton Memorial Veterans Hospital is evaluating a single-arm cohort to determine the feasibility and safety of extending the INR follow-up interval up to twelve weeks in patients with long-term stability on warfarin. The purpose of this study is to compare patient satisfaction for individuals who were maintained on a 12-week extended INR interval for six months in the previously mentioned study versus patients who were on a DOAC and managed at the same clinic. **Statement of Methods Used:** A chart review of DOAC patients that meet the inclusion and exclusion criteria of the previously mentioned extended INR follow-up interval study will be used to identify a comparable patient population. Every patient on a DOAC who fits the criteria will be mailed a modified Duke Anticoagulation Satisfaction Scale survey along with informed consent and health insurance portability and accountability act (HIPAA) authorization forms. Patients who return the mailed materials will be compared to the patients who maintained a 12-week INR follow-up interval six months into the previously mentioned study. The Mann Whitney U Test will be used to assess the primary outcome of patient satisfaction with anticoagulation therapy between the two groups.

Results/Conclusion: Collection of information is currently in progress. Final results and conclusion will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Recognize the inclusion and exclusion criteria that may be used in an anticoagulation-based study
Translate data on patient satisfaction for use in future anticoagulation management

Self Assessment Questions:

Which of the following patients should be excluded from this study?

- A An 82 YOM with PMH of T2DM, HTN, Afib on dabigatran who has
- B: A 77 YOF with PMH of Depression, Stroke on apixaban with a CrC
- C: A 67 YOM with PMH of HTN, CHF, Afib on rivaroxaban with an ac
- D: An 84 YOF with a PMH of Afib, RA on dabigatran with an upcomin

Among already published literature, which of the following are potential reason(s) why there was not an improvement in an overall cohort for anticoagulation satisfaction when extending the INR monito

- A Enrolled patients had a high time in therapeutic range (TTR) at ba
- B Decreased contact with clinic staff may have led to decreased eng
- C Warfarin-treated patients became accustomed to consistent and fi
- D All of the above may explain the lack of change in satisfaction from

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-407L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

AMINOGLYCOSIDE PHARMACOKINETICS IN OBESE CRITICALLY ILL PATIENTS: A RETROSPECTIVE STUDY

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Purpose: A number of patient specific factors can affect the pharmacokinetics of aminoglycosides, critical illness and obesity are two that have been studied independently. No robust analyses have compared patients who are both critically ill and obese (CIO) to critically ill non-obese patients (CINO). Due to their narrow therapeutic index, accuracy of dosing aminoglycosides is vital for safety and efficacy. The primary objective of this study was to identify an optimal dosing strategy for aminoglycosides in CIO patients. The specific aims were to compare differences in the volume of distribution (Vd) of aminoglycosides between CIO versus CINO, compare the number of dose adjustments needed to achieve goal peak serum concentrations, compare morbidity and mortality, identify first dose aminoglycoside pharmacokinetic variables with different obesity classifications, and determine an equation that can be applied to CIO patients to accurately predict the first dose of an aminoglycoside. **Methods:** This retrospective, single center study included patients greater than or equal to 18 years old admitted to an intensive care unit (ICU) who received an intravenous aminoglycoside with measured serum concentrations. Exclusion criteria included incarceration, pregnancy, renal failure requiring renal replacement therapy, previous diagnosis of cystic fibrosis, and thermal injury greater than 30 percent of body surface area. This study required 128 patients to achieve a power of 80 percent. Variables will be analyzed by chi square or Fishers exact tests, as appropriate. Selected variables assessed a priori via multivariate logistic regression for creation of a dose-predicting equation included: renal function, hepatic dysfunction, fluid volume administered in the ICU, obesity classification, and concomitant use of nephrotoxic agents or vasopressors. A univariate analysis will be performed and factors that result in a p-value of less than 0.2 will be included in the multivariate analysis to assess for independent association. **Results:** Data collection and analysis are ongoing.

Learning Objectives:

Discuss characteristics, pharmacokinetics, and dosing strategies of aminoglycosides

Describe pharmacokinetic derangements in critically ill and obese patients

Self Assessment Questions:

What pharmacokinetic change(s) are expected in critically ill obese patients?

- A Decreased albumin causing increased volume of distribution
- B: Renal insufficiency causing increased elimination
- C: Fluid boluses causing decreased volume of distribution
- D: All of the above

What characteristics of aminoglycosides make them ideal candidates for extended-interval dosing?

- A Post-antibiotic effect
- B Concentration-dependent killing of bacteria
- C Nephrotoxicity related to time exposed to agent
- D All of the above

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-680L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DEVELOPMENT AND IMPLEMENTATION OF A TECHNICIAN LED PRE-SURGERY MEDICATION HISTORY PROGRAM

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Purpose: Within our organization, pharmacy technicians collect medication histories for patients in the emergency department, direct admissions to inpatient units, and prior to cycle one day one of chemotherapy in outpatient clinics. Medication histories for pre-surgery patients are currently completed by non-pharmacy employees. Nurses at pre-admission testing (PAT) centers presently call pre-surgery patients up to two weeks in advance to conduct a medication history as well as provide and gather information pertinent to the surgery. This project sought to develop a pharmacy technician led pre-surgery medication history workflow followed by a pilot of the workflow with orthopedic surgery patients at designated Kenosha and Racine, WI locations. **Methods:** Prior to creation of the project workflow, assessments of current medication history workflows and pharmacy resources occurred. Discussions with key stakeholders, including pharmacy, nursing, and informatics representatives assisted with identification of and solutions for potential workflow barriers. A pre-surgery medication history workflow and telephone script was created for pharmacy technicians to follow. Necessary steps were built into the electronic medical record (EMR) to help facilitate the workflow such as documenting the encounter and communicating with the PAT center at the pilot site. Educational sessions were held with the pharmacy technicians involved with the pilot and the PAT center at the pilot site to ensure understanding of the workflow. A summary of the project was also communicated to the orthopedic surgeons clinics in order to inform them of the project and the lack of impact on clinic workflow. The pilot will be initiated on February 8, 2017. **Results:** Creation of a pharmacy technician led pre-surgery medication history workflow and telephone script was created. Resource allocation metrics will be measured from February 22 to March 7, 2017. **Conclusion:** Pending

Learning Objectives:

Recognize important components of workflow creation for a pre-surgery medication history program.

Identify important metrics used to evaluate resource allocation for a pre-surgery medication history program.

Self Assessment Questions:

Which of the following is an important component of workflow creation for a pharmacy technician led pre-surgery medication history program?

- A Evaluate if patients typically know their medications during a medication history
- B Build EMR functionality for remote communication regarding medication history
- C Communicate with patients about the potential for a medication history
- D Create documentation for pharmacy technician satisfaction

Which of the following is an important metric used to evaluate resource allocation for a pre-surgery medication history program?

- A Time to complete patient phone call
- B Time to organize patient list
- C Stress level associated with conducting a medication history
- D Number of patients that do not know their medications

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-918L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPROVEMENTS IN PHARMACIST ACCESS AND PHARMACIST UTILIZATION IN PATIENT ALIGNED CARE TEAMS AT THE DAYTON VETERANS AFFAIRS MEDICAL CENTER

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Purpose: Patient Aligned Care Teams (PACT) consist of a multitude of health care providers working collaboratively in outpatient clinics to treat and prevent a wide variety of chronic and acute illnesses for the veterans. Improving patient access to care has become an increasingly important issue to solve in order to optimize outcomes. Utilizing clinical pharmacy specialists (CPS) to see patients in between provider visits for specific chronic medication management is a solution to ameliorate the access of care problem in PACT clinics. The purpose of this project is to assess if primary care providers in PACT clinics at the Dayton VA Medical Center have comparatively increased the utilization of CPSs between 2013 and 2016. This research project will also look at how much time the CPSs have saved the primary care providers with the increase in utilization. **Methods:** A retrospective chart review was conducted of all primary care clinic appointments in the time period from March 1st through May 31st in the years 2013 and 2016 with the same provider. Demographic information, comorbidities, reason for clinic appointment, which chronic disease states medications were adjusted at the appointment, number of clinical pharmacist consultations, time between follow-up appointments, and type of appointment (telephone or face-to-face) will be collected. Comparisons of the number of pharmacist consultations and the number of patients who a pharmacist could have been consulted on will be used to draw conclusions on the utilization of clinical pharmacy specialists between the two time periods. **Results & Conclusion:** Data collection and analysis is ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify factors that limit patients' access to care

Discuss the role/benefit of the clinical pharmacy specialist in the Patient Aligned Care Teams within the primary care clinic at the Veteran Affairs Medical Center

Self Assessment Questions:

On average, how many times per year can primary care providers in the PACT clinics see a patient based on their available appointment slots?

- A 2.5
- B 4
- C 7
- D 8

According to various studies, for every one dollar that is invested in utilizing clinical pharmacy specialists, what is the overall healthcare cost reduction?

- A \$0.50
- B \$1.20
- C \$4.81
- D \$7.35

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-799L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PATIENT OUTCOMES FOLLOWING IMPLEMENTATION OF PROCALCITONIN LEVELS IN A COMMUNITY HOSPITAL

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Purpose: Procalcitonin is an acute phase pro-inflammatory biomarker that may be used to guide antimicrobial therapy initiation and de-escalation. Procalcitonin has been studied as a biomarker to differentiate pneumonia and sepsis from other non-infectious disease states. Studies evaluating the use of procalcitonin levels have been most commonly conducted in the intensive care setting of academic medical centers. This study will evaluate patient outcomes following the implementation of a procalcitonin level laboratory assay in a community hospital. **Methods:** Patients admitted to the medical intensive care unit between June 1, 2015 and January 31, 2017 were analyzed for eligibility into this chart review study. Patients were included into the study if they had an admitting diagnosis of pneumonia, sepsis, or septic shock and stayed in the medical intensive care unit for a minimum of two days. Patients in the experimental group had to have at least one procalcitonin level collected during their admission. The control group was composed of matched patients admitted prior to the availability of procalcitonin levels in the health system. Patients were matched on admitting diagnosis, age, and simplified acute physiology score (SAPS II). The primary outcome measures are number of antibiotic agents, length of antibiotic therapy, length of intensive care unit stay, and length of hospital stay. The secondary outcome was the comparison of length of antibiotic therapy, length of intensive care unit stay, and length of hospital stay between patients in the experimental group that had a single procalcitonin level collected versus patients that had multiple procalcitonin levels collected during their admission. **Results & Conclusions:** Data analysis is ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify common disease states and medical settings that procalcitonin has demonstrated benefit in aiding anti-microbial selection and de-escalation

Discuss possible endpoints that can be achieved by utilizing and assessing procalcitonin levels in an acute care setting

Self Assessment Questions:

An increase in procalcitonin levels has been associated with which following disease state?

- A: Cellulitis
- B: Urinary tract infections
- C: Pneumonia
- D: Hepatitis

What is a possible endpoint that can be achieved by assessing procalcitonin levels in collaboration with other patient assessment tools?

- A: Increased payment reimbursement
- B: Decreased antibiotic usage
- C: Increased length of stay
- D: Decreased need of microbiology cultures

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-349L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EPIDEMIOLOGY AND OUTCOMES OF MILD-TO-MODERATELY IMMUNOSUPPRESSED PATIENTS WITH COMMUNITY-ACQUIRED PNEUMONIA (CAP)

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Current ATS/IDSA guidelines for the treatment of CAP do not provide treatment recommendations for the management of immunosuppressed patients. Some previous studies have identified immunosuppression as a risk factor for infections caused by multi-drug resistant organisms, but these studies often have heterogeneous definitions of immunosuppression and focus on high-levels of immunosuppressive conditions and therapies. The primary objectives of this study are to determine if mild-to-moderately immunosuppressed CAP patients have different pathogen distribution, and time to clinical stability, which may have implications for duration of therapy. This multi-center, retrospective, cohort study will include patients admitted to a medical service with pneumonia between December 1, 2015 and November 30, 2016. Patients must have also been discharged from one of 10-pilot hospitals participating in the Michigan Hospital Medicine Safety (HMS) Consortium with an International Statistical Classification of Diseases and Related Health Problems (ICD) revision 10 diagnosis for pneumonia. Subjects will be grouped into cohorts of either mild-to-moderately immunosuppressed or immunocompetent based on our predetermined definition of mild-to-moderately immunosuppressed. Infectious epidemiology will be evaluated through a comparison of non-CAP pathogens, which excludes *Streptococcus pneumoniae*, *Legionella* spp., *Chlamydia pneumoniae*, *Haemophilus influenzae*, *Mycoplasma pneumoniae*, and *Moraxella catarrhalis*, between mild-to-moderately immunosuppressed and immunocompetent patients. Time to clinical stability will also be assessed as a primary clinical outcome between the two cohorts. The incidence of Non-CAP pathogens isolated from mild-to-moderately immunosuppressed patients was significantly greater than from immunocompetent patients (39/274 [14.2%] vs. 200/2231 [9.0%], respectively; $P=0.0085$). Mean time to clinical stability did not differ between the two groups (2.6 days vs. 2.71 days, respectively; $P=0.44$). Further results will be presented at Great Lakes Pharmacy Resident Conference. Mild-to-moderately immunosuppressed patients were more likely to have sputum cultures positive for pathogens, other than traditional CAP pathogens, but the mean time from admission to clinical stability were similar between groups.

Learning Objectives:

Describe the need for studies investigating the inpatient management of mild-to-moderately immunosuppressed patients with CAP.

Recognize that the treatment of CAP in mild-to-moderately immunosuppressed patients may not require longer durations of antibiotic therapy.

Self Assessment Questions:

Current treatment guidelines for the inpatient management of CAP in an immunosuppressed patient would recommend initiating empiric antimicrobial therapy with which agent?

- A: Azithromycin
- B: Levofloxacin
- C: Piperacillin-tazobactam
- D: None of the above. The current CAP guideline does not address this

Which of the following is not a common CAP pathogen:

- A: *Streptococcus pneumoniae*
- B: *Enterococcus faecalis*
- C: *Chlamydia pneumoniae*
- D: *Haemophilus influenzae*

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-705L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PHARMACOGENETICS EDUCATIONAL SERIES AND DEVELOPMENT OF CLINICAL DECISION SUPPORT SOFTWARE

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Purpose: Pharmacogenetics is a rapidly growing but often underutilized field. Barriers to implementation include clinicians limited knowledge and absence of software support. This project assesses the effectiveness of a six-presentation series on clinicians knowledge of pharmacogenetics. Additionally, clinical decision support (CDS) was developed to reinforce knowledge and allow practical application of pharmacogenetics. This will create a foundation upon which pharmacogenetic services at Monroe Clinic can be expanded.

Methods: Pharmacogenetics lectures were provided to a pre-selected group of clinicians and managers. Topics included: introduction to pharmacogenetics, neurology, cardiology, germline oncology, somatic oncology, and implementation processes. Teaching effectiveness was measured through assessments using an electronic audience response system. Assessments were provided before and during each lecture, and before subsequent lectures to analyze long-term retention.

Additionally, a pharmacist team created standardized pharmacogenetic CDS. The informatics pharmacist developed discrete documentation fields for pharmacogenetic test results within the electronic medical record. Alerts with specific criteria were designed to advise clinicians ordering an interacting medication for a patient with documented pharmacogenetic results. Alerts also suggested recommended alternatives. These alerts were approved by the Monroe Clinic Pharmacology and Therapeutics Committee. Effectiveness and relevance of the alerts was tracked through analysis of alert frequency and acceptance/override frequency. Preliminary Results: Regarding the pharmacogenetic lecture series, to date the average pre-assessment score was 34.2%, with a post-lecture score of 76.5%, and a revisit-score of 64.3%. Thus there is a considerable increase in knowledge that diminishes slightly over time. To date there have been no drug-gene interactions resulting in a pharmacogenetic alert. This is likely due to the limited number of patients with pharmacogenetic test results available in Monroe Clinics electronic medical record. Conclusion: Clinicians and managers are learning and retaining pharmacogenetic information over several weeks. Pharmacogenetic tests are still too new and infrequent to assess effectiveness of clinical decision support.

Learning Objectives:

Describe strategies to overcome two common barriers to implementation of clinical pharmacogenetic services.

Discuss effectiveness of an educational series on clinicians and managers retention of pharmacogenetic knowledge.

Self Assessment Questions:

What are two common barriers to implementation of clinical pharmacogenetic services?

- A: Absence of examples for process implementation and timeliness
- B: Cost of genetic testing and lack of patient interest
- C: Lack of clinician education and lack of software support
- D: Lack of clinician interest and minimal reimbursement for testing

Which of the following is true regarding the results of this study?

- A: Inconsistencies among the presenters could be a source of bias
- B: Clinical decision support was shown to be valuable in selection of
- C: Clinicians' knowledge of pharmacogenetics increased continuously
- D: A lecture series is an effective means of educating clinicians regarding

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-405L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

READMISSION RATES AFTER THE ESTABLISHMENT OF A STABLE ORAL LOOP DIURETIC REGIMEN PRIOR TO DISCHARGE FOLLOWING HOSPITALIZATION FOR HEART FAILURE EXACERBATION

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When patients are admitted to the hospital for a heart failure (HF) exacerbation, loop diuretics are dosed aggressively and variably. Patients are often discharged before an optimal outpatient diuretic regimen is determined. The purpose of this analysis was to determine if a difference exists in the 30-day rate of readmission for patients admitted for a HF exacerbation who were established on a stable oral loop diuretic regimen for 24 hours prior to discharge compared to patients who were not established on a stable regimen. Stable oral loop diuretic regimen for 24 hours was defined as receiving the discharge diuretic regimen on the day prior to discharge. In this prospective cohort analysis, eligible patients were discharged from the Robley Rex VAMC with a diagnosis of HF exacerbation between October 1, 2016 and December 30, 2016. Following identification, each patient's loop diuretic regimen prior to admission, while admitted, and following discharge were assessed for stability. After discharge, patients were followed for 30 days to determine the incidence of readmission and mortality. Additionally, each patient's outpatient medication regimen was analyzed at time of original admission, discharge, and outpatient follow-up to assess if patient was prescribed guideline-directed medical therapy (GDMT). The primary outcome was the 30-day rate of readmission for patients who were discharged on a stable oral loop diuretic regimen compared to those who were not. Secondary outcomes assessed included the difference in mean time to readmission, incidence of readmission with dehydration or acute kidney injury (AKI), and mortality for each group. Finally, an additional secondary objective was to determine medication-related factors that may affect the rate of readmission, such as the presence of GDMT or a diuretic dose change at outpatient follow-up. Results and conclusions will be discussed at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss current guideline recommendations for optimal management of loop diuretic therapy prior to discharge for patients admitted with heart failure (HF) exacerbation

Identify medication-related factors that may be associated with an increased risk of hospital readmission in patients originally admitted for HF exacerbation

Self Assessment Questions:

For patients with advanced heart failure (HF) and patients with recurrent admissions, the Heart Failure Society of America recommends that an oral medication regimen should be stable for ____ hours prior

- A: 12
- B: 24
- C: 36
- D: 48

For a patient with HF with reduced ejection fraction (HFrEF) with mild fluid overload and no relevant contraindications to medications, which of the following medication regimens contains the recommended

- A: Lisinopril, metoprolol tartrate, furosemide, spironolactone
- B: Lisinopril, carvedilol, furosemide
- C: Lisinopril, metoprolol succinate, bumetanide, spironolactone
- D: Lisinopril, metoprolol succinate, furosemide

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-394L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF PHARMACY SERVICES FOR HEART FAILURE MANAGEMENT IN A VETERAN AFFAIRS MEDICAL CENTER

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Purpose: HFREF is associated with significant morbidity and mortality as well as high rates of hospital readmission. Current guidelines recommend the utilization of ACE inhibitors or ARBs and -blockers at target doses to reduce morbidity and mortality in patients with HFREF. The percentage of patients on target doses of heart failure medications remains low and readmission rates remain high at both a national and facility level. This study aims to assess heart failure management at the Richard L. Roudebush VAMC after the implementation of heart failure medication titration pharmacy services. **Methods:** A Pharmacy Heart Failure Medication Titration Clinic was developed at the Richard L. Roudebush VA Medical Center to improve the outcomes of patients with heart failure with reduced ejection fraction in both cardiology and primary care clinics. This is a prospective electronic chart review of all patients who were seen in the clinic for heart failure medication management between October 1, 2016 and March 31, 2017. Descriptive statistics will be used to characterize the study subjects and assess the primary outcome, which is the percentage of patients on target doses of a -blocker and an angiotensin-converting enzyme (ACEI) or angiotensin receptor blockers (ARB). Secondary outcomes such as time to target dose in days and in number of visits and rate of hospitalizations, rate of emergency department visits, and rate of interim care visits for heart failure will also be assessed. **Results and Conclusions:** Results and conclusions are pending and will be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

List the classes of medications that have been shown to reduce morbidity and mortality in patients with heart failure with reduced ejection fraction and were the focus of medication titration in this Pharmacy Heart Failure Medication Titration Clinic.

Identify roles in which pharmacists can have an impact on the management of heart failure based on current literature.

Self Assessment Questions:

Which of the following medications could be the focus of medication titration in this Pharmacy Heart Failure Medication Titration Clinic?

- A: Amlodipine
- B: Enalapril
- C: Venlafaxine
- D: Furosemide

Literature supports the impact of pharmacists in which of the following areas of heart failure management?

- A: Medication titration
- B: Disease state education
- C: Medication reconciliation
- D: All of the above

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-665L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DEXAMETHASONE VERSUS PREDNISONE/PREDNISOLONE/METHYLPREDNISOLONE FOR THE TREATMENT OF PEDIATRIC ACUTE ASTHMA EXACERBATIONS IN HOSPITALIZED PATIENTS

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Statement of the Purpose: Corticosteroids in conjunction with beta-agonist medications remain the mainstay of therapy for the management of pediatric acute asthma exacerbations. Although current guidelines recommend prednisone, prednisolone, or methylprednisolone, there lacks a clear consensus on the optimal choice of corticosteroid for treatment. Dexamethasone has been shown to be equally effective to a traditional 5 day course of prednisone/prednisolone in pediatric patients seen in the emergency department (ED). However, minimal data exists for those admitted to the hospital. The purpose of this study is to assess the difference in hospital length of stay in pediatric patients requiring admission for a mild to moderate acute asthma exacerbation who received an initial corticosteroid dose of dexamethasone versus prednisone/prednisolone/methylprednisolone. The primary outcome is the difference in hospital length of stay between both groups. Secondary outcomes include total cumulative steroid dose, total duration of steroid utilization, and need for escalation of care during hospitalization.

Statement of the Methods Used: This is a retrospective, single centered, cohort study. ICD-10 codes were used to identify pediatric patients between the ages of 2 and 17 years old who presented to the ED at Loyola University Medical Center between January 1, 2014 to December 22, 2016 for an acute asthma exacerbation. Participants were identified for inclusion based on age, admitting floor, and receipt of any formulation of dexamethasone, prednisone, prednisolone, or methylprednisolone as initial management. Patients were required to have a documented diagnosis of asthma. Baseline Characteristics will be analyzed using descriptive statistics. Continuous data will be analyzed using a t-test. A Chi-Square or Fishers exact test, as appropriate, will be used to analyze categorical data. A multivariate analysis will be used to identify independent variables and determine if administration of dexamethasone versus prednisone/prednisolone/methylprednisolone affects length of stay.

Results/Conclusion: Pending

Learning Objectives:

Review the current literature regarding the use of dexamethasone in the management of pediatric acute asthma exacerbation

Identify the correlation between length of stay and initial corticosteroid administered for the management of pediatric acute asthma exacerbation

Self Assessment Questions:

What advantage might prednisone/prednisolone have versus dexamethasone for the management of an acute asthma exacerbation?

- A: More evidence-based recommendations on dosing and duration
- B: Improved compliance
- C: Lower incidence of vomiting
- D: Shorter course of therapy

Hypothetically, which agent is expected to result in a shorter length of stay in pediatric patients admitted for an acute asthma exacerbation?

- A: Prednisone/Prednisolone
- B: Dexamethasone
- C: Methylprednisolone
- D: Hydrocortisone

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-663L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF ENHANCEMENTS TO AN EXISTING ANTIMICROBIAL STEWARDSHIP CLINICAL DECISION SUPPORT (CDS) TOOL AND INCORPORATION INTO PHARMACIST CLINICAL REVIEW PROCESS

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Purpose: The Infectious Diseases Society of America (IDSA), Society of Healthcare Epidemiology of America (SHEA), and Center for Disease Control (CDC) support utilizing computerized clinical decision support (CDS) in an effort to develop comprehensive antimicrobial stewardship programs. These recommendations have accreditation implications for health systems in light of The Joint Commission New Antimicrobial Stewardship Standard, effective January 1, 2017. Additional decision support tools for pharmacists can utilize existing documentation within the electronic medical record to identify opportunities for antimicrobial intervention. Recent studies provide evidence for clinical and financial impacts with the use of such tools. The purpose of this project is to implement and evaluate the impact of expanding current antimicrobial stewardship (AMS) CDS tools. **Methods:** The Pharmacy and Therapeutics Antibiotic Subcommittee reviewed and prioritized antimicrobial rules to be developed. A taskforce comprised of an Infectious Disease (ID) pharmacist, Informatics Pharmacists, Health Information Technology Analyst, and Pharmacy Residents was assembled to implement and evaluate the rules. CDS for the following categories were included: de-escalation of therapy, duplicate therapy, and intravenous (IV) to oral (PO) conversion. The rules were built, tested, and implemented with ongoing feedback from the taskforce and general clinical pharmacists. To assess the impact of expanding the current CDS tools, the following endpoints were evaluated over a two-month period pre and post-implementation: antibiotic hours of therapy until de-escalation, and days of IV to PO therapy per patient. Opportunities for de-escalation were defined as intervention change from broad-spectrum antibiotics to targeted therapy. Results and conclusion: Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify opportunities for antibiotic de-escalation
Identify which setting AMS programs have demonstrated mortality benefits

Self Assessment Questions:

Vancomycin-resistant enterococci (VRE) sensitivity to which of the following antibiotics indicates an opportunity for de-escalation?

- A: Ceftriaxone
- B: Levofloxacin
- C: Piperacillin-tazobactam
- D: Ampicillin-sulbactam

The studies supporting mortality benefits with AMS programs were conducted in which patient population?

- A: Medicine
- B: Critical Care
- C: Oncology
- D: Ambulatory

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-502L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

SALTY OR SWEET? SAFETY OF HYPERTONIC SALINE VERSUS MANNITOL FOR INTRACRANIAL HYPERTENSION

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Purpose: Mannitol and hypertonic saline (HTS) are osmotic agents used to treat elevated intracranial pressure (ICP), yet literature is sparse comparing the side effect profile of these two agents. The purpose of this study is to assess the hemodynamic effects of HTS versus mannitol in patients with elevated ICP. **Methodology:** This retrospective, observational study evaluated critically ill adult patients admitted to St John Hospital and Medical Center during October 2009 to December 2016. Patients were included if they received at least six hours of osmotic therapy (mannitol or HTS) to reduce ICP secondary to intracranial hemorrhage. Patients who were pregnant, prisoners, expired (or confirmed brain death) within 24 hours of hospital admission, or received both hyperosmolar agents concomitantly were excluded. The primary endpoint was to compare the proportion of hypotensive events (SBP < 110 mmHg) while receiving HTS versus mannitol. The secondary endpoints were to assess the proportion of hypertensive events (SBP > 180 mmHg), cerebral perfusion pressures within target (50-70 mmHg), and serum osmolality values > 320 mOsm/kg. Antihypertensive medication prior to admission, vasoactive therapies, and massive transfusion requirements are being recorded to assess for potential confounders. Hospital and ICU length of stay as well as discharge disposition is being assessed. Demographics will be reported via descriptive statistics. Continuous variables will be assessed with Student's t-tests and categorical variables with chi-square analyses. Multivariate analysis with logistic regression will be used to assess confounders. Results: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the etiology, pathophysiology and management of elevated intracranial pressure (ICP)

Identify the hemodynamic effects and safety profiles of hypertonic saline and mannitol

Self Assessment Questions:

Which of the following is an acceptable treatment option for the management of elevated ICP?

- A: Surgical intervention
- B: Hypertonic saline
- C: Mannitol
- D: All of the above

Which of the following statement is TRUE?

- A: Patients with acute intracranial hemorrhage require lower systolic
- B: Dexamethasone is a good option to reduce ICPs in traumatic brain
- C: Maintaining higher MAPs will facilitate improved cerebral perfusion
- D: Hypertonic saline is the preferred hyperosmolar agent in patients with

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-335L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF ORAL CHEMOTHERAPY MANAGEMENT PROGRAM ON PATIENT OUTCOMES

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Purpose: The paradigm of cancer treatment is rapidly changing with the increased availability of oral chemotherapy. These agents offer the advantages of patient convenience, less invasive treatment, and have the potential to reduce healthcare resources. However, oral agents are not without challenges, primarily due to the complex nature of chemotherapy regimens and the patients responsibility of self-administering the medication. Additionally, patients require a thorough understanding of the adverse effects (AE) in order to identify and manage AEs at home, or to know when to seek medical attention. To address these challenges, many pharmacist- and/or nurse-led oral chemotherapy management programs have been developed. Henry Ford Health System established a pharmacist- and nurse-led Oral Chemotherapy Management Program (OCMP) in 2014 to help increase the safety, effectiveness, and appropriate use of oral chemotherapies, as well as to increase financial revenue by insourcing prescriptions for oral chemotherapy and supportive care medications. Although OCMP has helped generate revenue for the health system, there is limited published data on the impact of OCMP on patient outcomes. The purpose of this study is to evaluate the impact of OCMP on decreasing patient burden from toxicities while taking capecitabine. **Methods:** This study is a retrospective, quasi-experimental study of patients who received capecitabine between January 1, 2012 to July 31, 2014 for pre-OCMP group and between August 1, 2014 to September 30, 2016 for post-OCMP group. The primary endpoint of this study is to compare the incidence of all-grades and grade 3/4 toxicities that are commonly associated with capecitabine before and after the initiation of OCMP. The secondary endpoints include discontinuation rates, emergency department visits, hospitalization rates, duration of therapy, adherence rates, and number of pharmacist/nurse interventions. **Results/Conclusions:** Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize common adverse effects associated with capecitabine
Define grade toxicities using Common Terminology Criteria for Adverse Effects (CTCAE)

Self Assessment Questions:

Which of the following is the most common adverse effect associated with capecitabine?

- A: Gastrointestinal hemorrhage
- B: Stevens-Johnson syndrome
- C: Hand-foot syndrome
- D: Paresthesia

RT is a 60-year-old male who is recently diagnosed with stage II rectal cancer. He is currently receiving radiotherapy and capecitabine. During the first week of OCMP follow up, the patient complains

- A: Grade 1 diarrhea
- B: Grade 2 diarrhea
- C: Grade 3 diarrhea
- D: Grade 4 diarrhea

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-930L05-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ESTABLISHMENT OF AN AMBULATORY MEDICATION MANAGEMENT (MTM) SERVICE IN A COMMUNITY TEACHING HOSPITAL

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Purpose: According to the American Pharmacists Association (APhA), pharmacists play a vital role in improving health outcomes, improving medication safety, preventing errors, and promoting the overall health of patients. Literature has established the benefit of pharmacist services provided through Medication Therapy Management (MTM) services in the retail pharmacy practice setting. Pharmacists have saved thousands of dollars annually in medication claims through MTM and have improved patient health outcomes. The retail setting also creates an accessible environment for pharmacists to educate patients on their medications and concomitant disease states. Although literature demonstrates MTMs positive effects in the retail setting, limited data is available that demonstrates these benefits in the ambulatory care setting. The purpose of developing this program in the ambulatory care setting was to optimize medication therapy regimes and decrease drug-related problems to the participant, provide education on both disease states and treatments, and encourage subjects to monitor their chronic conditions and take an active role in improving their care through both medical and lifestyle changes. **Methods:** This prospective, non-randomized study took place in the 443 bed community teaching hospital of St. Joseph Mercy Oakland. Subjects were recruited through promotional flyers placed in the hospital's outpatient pharmacy, wellness center, daycare center, and medical clinic. The primary outcome is the number of interventions made by the pharmacist and the acceptance rate for intervention recommendations made over a span of the services three visits. Secondary outcomes include change in medication adherence, number of medication adverse effects, change in medication costs, and patient satisfaction with the service. **Results and Conclusions:** Data collection and analysis is ongoing. Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize the benefits of MTM services provided by pharmacists in the retail pharmacy practice setting.
Identify potential benefits of establishing an ambulatory care service lead by pharmacists to make medication interventions and effect medication adherence.

Self Assessment Questions:

Which of the follow MTM outcomes is true based on supporting literature?

- A: Pharmacists save hundreds of dollars per patient in medication cl
- B: Pharmacists have reduced infections of dialysis patients by review
- C: Pharmacists have lowered the A1C of diabetes patients through p
- D: Pharmacist have increased the amount of weekly exercise comple

Which of the following are expected outcomes in creating an ambulatory medication management service?

- A: Improved medication adherence
- B: Reduction in mortality rates and hospitalizations
- C: Decrease physician visits
- D: Increase physician visits

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-758L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

UTILITY OF PREALBUMIN IN CRITICALLY ILL PATIENTS

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Purpose: Prealbumin (PAB) has been shown to be a useful index of nutrition status in clinically stable patients. In the setting of critical illness, however, PAB is a negative acute phase reactant. To what extent PAB reflects severity of illness or success of nutrition provision in critically ill hospitalized patients is unclear. The purpose of this study is to evaluate the relationship between changes in PAB and clinical outcomes in critically ill patients. **Methods:** This is a single-center, retrospective, non-randomized cohort study of patients admitted to the UK Chandler Medical Center adult intensive care units (ICUs) between August 1, 2008 and July 31, 2016. These participants were identified in the electronic medical record using eligibility criteria which include patients >18 years old with more than one PAB level, more than 4 consecutive days in the ICU, and first PAB level within 7 days of admission. Data collected includes PAB levels, SOFA scores, length of stay, in-hospital mortality, and nutrition support provided. Linear/logistic regression and Pearson's correlation test will be used to characterize the association between PAB levels and clinical outcomes. **Results:** Our study included 981 patients. The mean age was 59, 58% were male, 93% were white, and 85% were on surgery services. Mean initial PAB was 12.3 mg/dL and 58% of patients exhibited a net decrease in PAB during their hospitalization. Patients who exhibited a decrease in PAB had a longer duration of stay (20.5 vs. 19.7 days), but this difference was not statistically significant. A larger percentage of patients who died in hospital exhibited a decrease in PAB levels (12.5% vs. 10.3%), and the net difference in PAB was larger (-1.26 vs. -0.64), however these differences were not statistically significant. Further analysis on nutrition support and SOFA scores are pending.

Learning Objectives:

Discuss factors that affect prealbumin serum concentrations in critically ill patients

Review current evidence and guidelines regarding the use of laboratory markers as a surrogate for nutrition status in the ICU

Self Assessment Questions:

Which of the following affect prealbumin levels in critically ill patients?

- A Inflammation
- B: Corticosteroid use
- C: Surgery
- D: All of the above

Which of the following should be used to assess nutrition in critically ill patients according to the 2016 SCCM/ASPEN Nutrition Support Guidelines

- A Comorbid conditions
- B Prealbumin
- C Albumin
- D Anthropometrics

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-627L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

INCREASING USE OF OUTPATIENT TREATMENT OF CHEMOTHERAPY INDUCED FEBRILE NEUTROPENIA FOR ONCOLOGY PATIENTS.

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Purpose: Neutropenic fever (NF) is an emergent complication of chemotherapy which commonly occurs in cancer patients. The MASCC (Multinational Association for Supportive Care in Cancer) scoring tool is prospectively validated to identify patients at low risk of NF complications. Despite a UW Health clinical practice guideline supporting outpatient NF treatment, many patients are admitted to an inpatient bed. The purpose of this project is to implement a process for the outpatient treatment of NF to safely reduce unnecessary hospital admissions. **Methods:** A retrospective chart review was conducted of patients with a discharge diagnosis of NF from the calendar year of 2014 for qualification for outpatient treatment. A multidisciplinary workgroup revised the NF guideline and charted the decision map for triage of NF patients. Electronic medical record clinical decision support tools were implemented to assist practitioner evaluation of patient eligibility for outpatient treatment. Outpatient NF supportive care plans and order set guided antimicrobial therapy selection as well as lab and clinic follow-up for patients. Pharmacists reviewed supportive care plan selection and contacted patients following initiation of the outpatient treatment regimen to assess patient response and indications for change in therapy. The primary outcome measure is the number of NF cases treated as an outpatient. **Preliminary Results:** The review identified 85 patients admitted for chemotherapy-induced NF, of which 53 patients had a MASCC score ≥ 21 , and 15 had no exclusions to outpatient treatment. The most common exclusions were antibiotic therapy within 72 hours of admission (12 patients) and absolute neutrophil count < 100 cell/mm³ (22 patients). Anticipated results following electronic decision support implementation include a reduction in the percentage of admitted patients qualifying for outpatient treatment. **Conclusions:** Preliminary results indicate an opportunity to increase outpatient treatment of febrile neutropenia, and electronic medical record tools may increase adherence to guideline recommendations.

Learning Objectives:

Review patient eligibility criteria for outpatient treatment of neutropenic fever

Describe recommended oral antibiotics for empiric neutropenic fever treatment

Self Assessment Questions:

Which of the following is included in the MASCC evaluation for low-risk neutropenic fever?

- A Control of cancer
- B: Comorbidities requiring hospitalization
- C: Burden of illness
- D: Presence of hypertension

Which of the following antibiotic combinations carry a category 1 level of evidence from the NCCN for empiric treatment of neutropenic fever in low-risk patients?

- A Amoxicillin/clavulanate and ciprofloxacin
- B Amoxicillin/clavulanate and levofloxacin
- C Amoxicillin/clavulanate and moxifloxacin
- D Levofloxacin alone

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-340L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

A RETROSPECTIVE REVIEW TO DETERMINE THE EFFICACY OF FECAL MICROBIOTA TRANSPLANTATION VIA COLONOSCOPY IN A COMMUNITY HOSPITAL FOR RECURRENT, REFRACTORY, OR SEVERE CLOSTRIDIUM DIFFICILE INFECTION

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Purpose: Clostridium difficile infection (CDI) is the leading cause of hospital-acquired diarrhea. Treatment options outlined in evidence-based guidelines remain unclear for CDI classified as greater than two recurrences. Fecal microbiota transplantation (FMT) is gaining popularity as a treatment option in this setting due to increasing literature to support both its efficacy and favorable side effect profile. While literature for FMT is expanding, no current published studies have evaluated the efficacy of a commercially available stool product. In July 2015, Norton Womens and Childrens Hospital implemented an FMT Protocol outlining appropriate use in patients with recurrent, refractory, or severe CDI using a commercially available product from a nonprofit stool bank. To date, over 40 transplants have been performed by one Norton Healthcare gastroenterology practice. The purpose of this study is to determine the clinical cure rate of FMTs performed within the institution and to assess compliance to the protocol. **Methods:** This is an IRB-approved, retrospective study of adult patients who received FMT via colonoscopy at Norton Womens and Childrens Hospital between July 1, 2015 and October 31, 2016. The primary endpoint is to determine the percentage of patients who achieved clinical cure at 10 weeks post-FMT. Secondary endpoints include the percentage of patients that had compliance with all components outlined in Norton Healthcare's FMT Protocol (as a composite), and the rate of adherence to each individual component. The four protocol components include: all antibiotics (CDI and non-CDI) stopped 48 hours prior to FMT; documented recurrent, refractory, or severe/fulminant CDI; no exclusion criteria present at time of transplant; and follow-up visit scheduled with provider 4 to 8 weeks after procedure. **Results and Conclusions:** Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify treatment options for Clostridium difficile infections as defined by the Infectious Diseases Society of America (IDSA) guidelines

Select an appropriate patient that may benefit from a fecal microbiota transplant

Self Assessment Questions:

Which of the following has a well-defined role in therapy for C. difficile infections according to IDSA guidelines?

- A: Fecal microbiota transplantation
- B: Vancomycin
- C: Fidaxomicin
- D: Tigecycline

Which of the following patients could potentially benefit from an FMT based on meeting the definition of recurrent, refractory, or severe CDI?

- A: Three episodes of mild-moderate CDI and failure of a 6-8 week course
- B: First episode of mild-moderate CDI resulting in hospitalization
- C: Moderate CDI not responding to standard therapy after 2 days
- D: Severe or fulminant CDI not responding to standard therapy after 48 hours

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-400L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF AMIKACIN TARGET ACHIEVEMENT IN ADULT CYSTIC FIBROSIS PATIENTS UTILIZING MONTE CARLO SIMULATION

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Purpose: Pseudomonas aeruginosa is a common pathogen in cystic fibrosis (CF) patients. Persistent infection with Pseudomonas is associated with decline in lung function and survival. The Cystic Fibrosis Foundation guidelines recommend treating acute pulmonary exacerbations with a combination of anti-pseudomonal antibiotics; most frequently a beta-lactam combined with an aminoglycoside. Amikacin is the second most commonly used aminoglycoside, behind tobramycin, in adult CF centers. Once-daily dosing has shown benefit by resulting in higher peak concentrations, maximizing the concentration-dependent pharmacodynamic profile. A peak 80-120 mg/L or peak:MIC ratio >8 with trough <5 mg/L is targeted for maximizing efficacy while minimizing adverse effects. Amikacin 30-35 mg/kg/day with subsequent doses determined by therapeutic drug concentration monitoring has become an accepted dosing strategy without strong evidence supporting this practice. Dosing of aminoglycosides in CF patients differs from the general adult population due to altered pharmacokinetics/pharmacodynamics related to the underlying disease. The primary objective is to utilize pharmacokinetic/pharmacodynamic data from adult CF patients that have received amikacin to determine the probability of target attainment for Pseudomonas infections. We hypothesize goal peaks and troughs are being attained with the recommended dosing. **Methods:** This is a single-center, non-randomized, retrospective cohort study of patients >18 years with CF exposed to amikacin. All patients were admitted to the University of Kentucky Medical Center between January 1, 2010 and July 31, 2016. Minimum inhibitory concentration (MIC) values for amikacin were collected to complete a Monte Carlo simulation (MCS). MICs were collected from adult CF patients with a Pseudomonas positive sputum culture between January 1, 2014 and September 6, 2016. The MCS will be used to predict concentration-time profiles of different doses of amikacin in adult CF patients. **Results and Conclusion:** Data collection and analysis are ongoing. Preliminary results and conclusions will be presented at the 2017 Great Lakes Residency Conference.

Learning Objectives:

Explain the gap in primary literature regarding dosing of amikacin in adult CF patients

Identify the inputs needed for a Monte Carlo simulation to predict antibiotic concentration-time profiles and determine the likelihood of reaching a therapeutic target

Self Assessment Questions:

Which of the following circumstances contribute to a lack of knowledge concerning optimal dosing strategies of amikacin for Pseudomonas aeruginosa in adult patients with Cystic Fibrosis? I. Pseudomonas

- A: I, ii
- B: I, iii
- C: ii, iii
- D: III, and IV

A Monte Carlo simulation requires which of the following to simulate target attainment in a specific patient population?

- A: Minimum inhibitory concentration (MIC)
- B: Creatinine clearance
- C: Peak:MIC ratio
- D: Forced expiratory volume in one second (FEV1)

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-310L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PREADMISSION BETA-BLOCKER IN CRITICALLY ILL SEPTIC PATIENTS: EFFECTS ON POST-DISCHARGE MORTALITY IN A VETERAN POPULATION

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Purpose: The purpose of this study is to evaluate the 90-day mortality of septic intensive care unit (ICU) patients receiving preadmission beta-blockers. **Methods:** This study is a retrospective cohort study of all patients admitted to an ICU at a VA medical center with a diagnosis of sepsis between January 1, 2014 and January 1, 2016 utilizing the national VA database. The study group includes patients with preadmission beta-blocker use, defined as at least 1 refill of a beta-blocker medication within 30 - 120 days prior to admission. The control group includes patients with no preadmission beta-blocker use. Baseline patient information that will be collected includes age, gender, height, weight, and comorbidities. Hospital admission data that will be collected includes length of ICU stay, source of sepsis, positive culture growth, IV beta-blocker administration, IV vasopressor administration, blood pressure, respiratory rate, mental status, blood lactate, serum creatinine, and liver function tests. Outpatient medication history will also be assessed for use of a beta-blocker pre and post-admission. Specific beta-blocking agents identified during chart review will be recorded and reported. The primary survival outcome will be compared using a time to event analysis. The primary endpoint compares the rate of 90-day mortality between the study and control groups. The secondary endpoints compare 30-day and 90-day mortality between patients based on type of preadmission beta-blocker and source of sepsis as well as the overall rate of 30-day mortality between study and control groups. Data collection and analysis are ongoing and will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize the potential mechanisms for mortality benefit of beta-blockers in patients with sepsis.

Describe previously published data on the use of beta-blockers and mortality benefit on septic intensive care unit patients.

Self Assessment Questions:

1. Which of the following are proposed mechanisms for mortality benefit of beta-blockers in patients with sepsis?

- A: Increased norepinephrine to achieve target heart rate
- B: Increased blood lactate during initial presentation
- C: Decreased blood lactate during initial presentation
- D: Tachycardia

2. One limitation of the previous study discussed on the mortality benefit associated with the use of beta-blockers prior to an ICU hospitalization for sepsis is:

- A: Small study population
- B: Lack of clinical information at baseline such as source of sepsis
- C: Lack of adjustment for imbalance between baseline comorbidities
- D: Did not define pre-admission beta-blocker exposure for the study

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-303L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PHARMACIST-INITIATED DE-ESCALATION OF EMPIRIC IV VANCOMYCIN THERAPY IN CRITICALLY ILL PATIENTS UTILIZING MRSA PCR NASAL SCREENS

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Purpose: Intravenous vancomycin is first-line therapy for suspected methicillin-resistant *Staphylococcus aureus* (MRSA) infections. It is frequently initiated for acutely ill patients with risk factors for MRSA and signs of an infection. Culture and susceptibility results guide the de-escalation of vancomycin. However, timely discontinuation remains a concern. Nasal MRSA screens are shown to have a negative predictive value of up to 99 percent for detecting MRSA. The purpose of this study is to utilize MRSA PCR nasal screens to facilitate timely de-escalation of IV vancomycin therapy in critically ill patients. **Methods:** A protocol was approved by the hospital medication use committee to de-escalate vancomycin based on negative MRSA nasal screen results. Adult patients receiving IV vancomycin that meet inclusion criteria are eligible for de-escalation of vancomycin by clinical pharmacists within 48-72 hours of admission. In this IRB-approved study, IV vancomycin usage was evaluated in critical care units before implementation of the de-escalation protocol and will be evaluated post-implementation. Vancomycin days of therapy is the primary outcome; secondary outcomes include length of stay and incidence of serum creatinine elevations. Descriptive statistics and a student t-test will be utilized in analyzing data. **Results:** Retrospective review of 135 charts conducted prior to implementation of the protocol revealed that 41 patients within a two-month period were eligible for de-escalation per the new protocol. Average days of vancomycin therapy were four; it was projected that discontinuation per the protocol would have reduced days of vancomycin therapy by 79 days in two months. Average length of stay was nine days and 13 patients (9.6%) had serum creatinine elevated 1.5 times greater than baseline during hospitalization. **Conclusion:** The initial retrospective review revealed opportunities for timely de-escalation of empiric IV vancomycin and reduction in days of vancomycin therapy. Results of the vancomycin use evaluation will be comparatively analyzed to post-implementation utilization data.

Learning Objectives:

Review risk factors for methicillin-resistant *Staphylococcus aureus* (MRSA) and identify when empiric vancomycin use is appropriate

Describe how MRSA PCR nasal screens can be utilized as a tool to facilitate antimicrobial stewardship

Self Assessment Questions:

Which of the following criteria is a risk factor for MRSA?

- A: Hospitalization in 2010
- B: Chronic dialysis; 2 sessions/week
- C: Regular attendance at a local gym
- D: Uncontrolled hypertension

Which of the following statements is true regarding the predictive value of MRSA PCR nasal screens?

- A: The positive predictive value is high enough such that it can aid in
- B: The negative predictive value is low enough such that it can aid in
- C: The positive predictive value is low enough such that it can aid in
- D: The negative predictive value is high enough such that it can aid in

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-494L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PREVALENCE OF PRESCRIBED UNMEASURABLE LIQUID MEDICATION DOSES TO NEONATAL PATIENTS

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Purpose: Each year, St. Vincent Womens Hospital discharges approximately 800 infants from its 85 bed neonatal intensive care unit (NICU). Many of these infants are discharged home on at least one medication. Due to weight based dosing and the electronic health record (EHR) system, doctors are typically unaware of the dose volume that is prescribed during the patients stay. Currently, there is no message to alert a physician that the prescription may result in an unmeasurable dose. The challenges faced by families can be exacerbated by being prescribed an unmeasurable dose that requires them to guess or incorrectly assume the dose. The purpose of this study is to identify and reduce prescribing errors and improve pediatric medication safety. The primary objective is to describe the proportion of oral liquid discharge prescriptions that are written for an unmeasurable dose. The secondary objectives are to describe the patient and discharge medication characteristics and to assess these characteristics in relation to the unmeasurable doses prescribed. **Methods:** This study is a retrospective analysis of patients discharged from the NICU between January 1, 2016 and June 30, 2016. Only patients who were discharged on at least one oral liquid medication were included in the study. Patients were identified through the billing department and the EHR was used to collect data on the patient and his or her medications. Patient demographic information was collected and included age, weight, and month of discharge. Discharge medication specific information such as name, dose, route, frequency, measurability, drug class, prescriber status, and medication education was also collected. **Results and Conclusion:** Data collection is ongoing. Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe common medication errors and causes of errors that are seen in the pediatric patient population.

Identify a potential medication safety issue in the medication discharge process at the neonatal intensive care unit at St. Vincent Womens Hospital.

Self Assessment Questions:

What is the standard volumetric unit per the National Council for Prescription Drug Programs?

- A: Dram
- B: Tablespoon
- C: Tsp
- D: mL

AR is 4yoM who weighs 16.6kg. His MD prescribed him ranitidine 4mg/kg PO BID. Ranitidine syrup comes in a 15mg/mL concentration. What dose would you recommend for AR who is provided a 5mL syringe?

- A: 4.4 mL
- B: 4.43 mL
- C: 4.427 mL
- D: 4.5mL

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-917L05-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PRECEPTOR DEVELOPMENT: CREATION AND IMPLEMENTATION OF AN ENTERPRISE-WIDE PROGRAM

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Purpose: To implement a sustainable enterprise-wide preceptor development program to improve preceptor and resident satisfaction, competence, and confidence. **Methods:** A 13 question electronic survey was distributed to pharmacists at seven Vizient member health-systems to assess their departments current states of preceptor development. Survey questions focused on assessment of pharmacists educational needs, preferences for educational content, views on didactic resources offered at their institutions, and root causes for lack of participation in available programming if applicable. In addition, a 15 question electronic survey was circulated to current and immediate past residents of UW Health to attain their views on preceptor effectiveness. The survey responses were reviewed and analyzed to understand barriers to sponsoring preceptor development and identify opportunities for improvement. A department wide steering committee comprised of residency program directors, pharmacy managers, preceptors, and residents was assembled to analyze and provide insight on the results of the survey, policy development, training workflows, and overall framework for designing the program. In addition, all internal Residency Program Directors (RPDs) were interviewed to determine what preceptor development programming existed in their programs and identify options for collecting and maintaining preceptor qualifications. A gap analysis of all residency programs was also completed to assess compliance with ASHP residency accreditation standards. Implementation of the program will include the creation and approval of a new preceptor development policy and procedures approved by the Lead Preceptor Committee and Residency Advisory Committee, utilization of a database to dynamically track preceptors development across the enterprise, and establishment of preceptor tiers based on specifications detailed in the policy and procedure on preceptor development. Content to support preceptor development will be established through collaboration with the Vizient Professional Development and Workforce Committee.

Summary of results: Results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify preceptor development requirements per the ASHP Accreditation Standards for Pharmacy Residency Programs

Describe essential requirements for a sustainable preceptor development program

Self Assessment Questions:

Which of the following ASHP preceptor development requirements was the most frequently cited during onsite accreditation visits?

- A: Preceptors discuss residents' verbal/written assessment towards residents
- B: Preceptors participate actively in the residency's QI processes
- C: Preceptors must demonstrate commitment to advancing the residents' education
- D: Preceptors must demonstrate the ability to precept residents' education

Which of the following steps is considered a key aspect in the development of a sustainable preceptor development program?

- A: Integration of personnel and precepting data collection
- B: Changing the organization's practice model
- C: Forcing preceptors to complete preceptor specific CE
- D: Creating educational material without buy-in from frontline staff

Q1 Answer: A Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-911L04-P

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PHARMACIST AMBULATORY CARE SERVICES IN HEART FAILURE MANAGEMENT

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Purpose: Studies show that pharmacist involvement in heart failure (HF) management improves clinical care, yet HF outcomes are not optimized. The objective of this study is to initiate pharmacist HF services in a mid-size clinic system and determine effect on patient outcomes and guideline adherence. **Methods:** The study has been approved by the Institutional Review Board. Pharmacist HF services will be implemented according to institution-approved protocol. The pre-intervention cohort consists of patients with a diagnosis of heart failure with reduced ejection fraction (HFrEF) managed by an Indiana University Health Southern Indiana Physicians (IUHSIP) cardiologist. The post-intervention investigational cohort includes patients with HFrEF managed by an IUHSIP cardiologist and referred to pharmacist services to be compared with the control cohort of patients with HFrEF diagnosis managed by an IUHSIP cardiologist but not referred to pharmacist services. Retrospective chart review will be conducted for pre-implementation (n=84) and post-implementation groups to determine which HF patients meet the primary composite endpoint of: percentage of patients taking an angiotensin converting enzyme inhibitor (ACEi), angiotensin receptor blocker (ARB), or angiotensin receptor-neprilysin inhibitor (ARNI) at target dose; taking a beta blocker at target dose; and who have received pneumococcal and up-to-date influenza immunizations. Secondary endpoints include change in 30-day HF hospital readmission rate and percentage of patients on an aldosterone antagonist. Data analysis for the primary and secondary endpoints will compare pre- and post-implementation rates, as well as rates between post-implementation pharmacist and non-pharmacist groups.

Results: Baseline data of 84 HFrEF patients shows 29% prescribed an ACEi, ARB, or ARNI at target dose and 5% prescribed a beta blocker at target dose. Only 32% have both pneumococcal and up-to-date influenza vaccinations documented. Those prescribed an aldosterone antagonist comprise 36%. Average 30-day HF readmission rate for the first half of 2016 is 9.5%. **Conclusions:** Not yet determined

Learning Objectives:

Identify guideline-based target medication regimens for heart failure management

Discuss important interventions pharmacists can make in the management of heart failure

Self Assessment Questions:

Of the following medication regimens, which reflects target treatment dose of guideline-approved heart failure medications?

- A: carvedilol 12.5 mg BID
- B: furosemide 40 mg BID
- C: benazepril 40 mg daily
- D: metoprolol tartrate 200 mg BID

Which of the following interventions is the most appropriate for a pharmacist to make for a patient's heart failure management?

- A: In a patient with significant edema, increase furosemide from 20 mg daily to 40 mg daily
- B: In a patient with blood pressure of 90/40 mmHg, increase carvedilol 12.5 mg BID to 25 mg BID
- C: In a patient currently without symptoms, add spironolactone 25 mg daily
- D: In a patient experiencing adverse effects with lisinopril 40 mg daily, decrease to 20 mg daily

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-337L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPROVING THE APPROACH TO BETA-LACTAM ALLERGIES IN A SURGICAL POPULATION

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Purpose: Beta-lactam allergies are frequently reported but a majority of these are not true or severe in nature. This leads to unnecessary avoidance of beta-lactam therapy in situations in which they are preferred, including prophylaxis for surgical procedures. The objectives of this project are to improve the assessment and documentation of beta-lactam allergy histories and to improve antibiotic selection for surgical prophylaxis in patients with a documented beta-lactam allergy undergoing an elective procedure. **Methods:** This was a pre-/post-comparison of the effects of redesigned beta-lactam allergy history assessment and documentation and pharmacist involvement in antibiotic selection within the elective surgery population at two community medical centers. Two interventions were implemented. First, nurses responsible for calling patients prior to a scheduled procedure were tasked with asking specific questions regarding beta-lactam allergy history including reaction type, date of reaction, and subsequently tolerated beta-lactam medications. These details were added to the allergy section of the electronic medical record. This process was implemented in October 2016. The second process was implementation of pharmacist review and intervention (if appropriate) of surgical prophylaxis orders for beta-lactam allergic patients on the days preceding their scheduled procedure. An algorithm that considers the patient's allergy history was created to guide utilization or avoidance of beta-lactam therapy. This process was implemented in January 2017. The primary outcomes to be measured are the percentage of beta-lactam allergic patients with documentation of allergy type and date, documentation of subsequently tolerated antibiotics, receipt of beta-lactam antibiotic, and newly documented adverse reactions. These outcomes will be compared for the following time frames: August to September 2015; August to September 2016; and February to March 2017 with a goal of 100 patients within each group. **Results/Conclusions:** Data collection is currently in progress. Results and conclusions will be presented at Great Lakes Residency Conference.

Learning Objectives:

Identify rationale for trials of beta-lactam medications in patients with reported beta-lactam allergies

Identify strategies to improve allergy assessment and antibiotic selection in patients with reported beta-lactam allergies

Self Assessment Questions:

Which of the following are potential benefits of using a beta-lactam over alternative therapy for surgical antibiotic prophylaxis for procedures in which beta-lactams are guideline recommended?

- A: Decreased incidence of adverse events
- B: Decreased incidence of surgical site infections
- C: Decreased cost
- D: All of the above

Which of the following are potential strategies for improved allergy assessment and/or antibiotic selection?

- A: Nurse-driven communication with the patient to collect and document allergy history
- B: Gathering the history of subsequently tolerated therapies and adding them to the allergy list
- C: Pharmacist algorithm-guided review of ordered antibiotic therapy
- D: All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-898L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PREPARATION PLAN FOR PHARMACY TECHNICIAN CERTIFICATION

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In 2011, the American Society of Health-System Pharmacists (ASHP) released a set of practice advancement initiatives (PAIs) to further optimize safety, efficiency, and accountability of pharmacy practice within hospitals and health systems. One PAI in particular emphasized the benefit of having well-educated, appropriately trained pharmacy technicians. ASHP recommends "uniform national standards" for the education and training of pharmacy technicians, which includes technician certification through the Pharmacy Technician Certification Board (PTCB) and licensure by state boards of pharmacy. The state of Wisconsin does not currently require pharmacy technicians to become certified through the PTCB or register with the state board of pharmacy. However, there is a great deal of perceived value to come from increasing the number of certified pharmacy technicians within a pharmacy department. For this reason, the Aurora Health Care (AHC) pharmacy department created a number of unique goals for 2017 related to enhancement of pharmacy technician training and job responsibilities. The purpose of this project was to create a preparation plan for pharmacy technician certification. This project aims to increase the likelihood of achieving a passing score on the pharmacy technician certification exam (PTCE) by establishing a standardized pre-examination review process for pharmacy technicians across our healthcare system to utilize. A reference manual summarizing information specific to the PTCE and the overall certification process was created to help technicians begin the process of becoming certified. Next, a series of study guides were designed to accompany independent exam review. Finally, a handful of AHC pharmacy technicians were identified to assist with this project by utilizing the preparation materials for PTCE review and providing feedback on ways to optimize these materials. The results of this project are currently pending, but a long-term increase in the number of certified pharmacy technicians employed by the AHC pharmacy department is anticipated.

Learning Objectives:

Recognize the 2011 ASHP recommendations for training and certification of pharmacy technicians

Identify three resources which may help to improve outcomes for pharmacy technicians navigating through the certification process

Self Assessment Questions:

Which of the following is correct regarding Wisconsin regulation of pharmacy technician training and certification?

- A: All pharmacy technicians must be certified by the PTCB
- B: All pharmacy technicians must register with the Wisconsin state board
- C: Wisconsin does not currently have requirements for pharmacy technicians
- D: All pharmacy technicians must be certified by the PTCB and registered with the Wisconsin state board

Which of the following resources may aid pharmacy technicians in preparing for and passing the PTCE exam?

- A: A reference packet outlining information specific to the PTCE (cos)
- B: Study guides to accompany independent review of a PTCE preparation
- C: Reimbursement for study materials and exam cost upon successful completion
- D: All of the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-752L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION AND IMPLEMENTATION OF INVENTORY MANAGEMENT PRINCIPLES IN A CENTRAL PHARMACY

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Effective inventory management is essential to controlling the cost of pharmaceutical products and providing timely delivery of medications to patients. Froedtert Hospital recently completed a value-stream map that identified numerous opportunities for improvement that relate to the use of carousel dispensing technology. The purpose of this project is to decrease waste, measured in terms of time, and to increase efficiency of the filling process within a central pharmacy. The steps taken to improve inventory management include evaluating and optimizing dispensing location, development and application of a standardized formula to improve inventory ordering points, and re-arrangement of inventory within carousel dispensing technology to decrease spin time and separate look-alike sound-alike medications. Average dispensing time for first-dose medications will be evaluated prior to and after implementation of these changes to determine the impact on daily workflow within the central pharmacy. Preliminary data indicates that 63 custom doses per day are dispensed from the central pharmacy and the processing time per dose requires 4.5 minutes of technician time and takes 25 minutes longer to process each order. Optimizing dispensing location decreases these labor resources needed to fill custom doses and ultimately leads to a decrease in first-dose dispensing time. Through optimization and re-arrangement of the medications stocked in carousel dispensing technology, average filling time of first-dose medications can be decreased. A standardized formula can be applied to each medication stocked within carousel dispensing technology to assist with adjustment of minimum and maximum ordering points but proper inventory management requires continuous re-assessment.

Learning Objectives:

Identify methods that can be used to decrease filling time of first-dose medications from a central pharmacy

Discuss the utility of applying a standardized formula to inventory ordering points

Self Assessment Questions:

All of the following methods can be utilized to improve inventory management in a central pharmacy except:

- A: Application of a standardized formula to inventory ordering points
- B: Re-arrangement of medications stocked within carousel dispensing technology
- C: Monthly evaluation of medication stock-outs and average use
- D: Dispense the majority of medications as custom-dose

What is an effective way to improve inventory management in a central pharmacy?

- A: Practice continuous evaluation of inventory ordering points through
- B: Determine minimum and maximum values based upon available b
- C: Dispense the majority of medications as custom doses
- D: Increase minimum and maximum ordering points based upon fees

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-762L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF COMPREHENSIVE MEDICATION REVIEWS ON ADHERENCE TO CMS MEASURED MEDICATION CLASSES AND EFFECT OF CLINICAL MAILINGS ON SUBSEQUENT UTILIZATION OF HIGH RISK MEDICATIONS

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Background: High rates of non-adherence to chronic condition therapies lead to hundreds of billions of dollars in annual cost. High risk medication (HRM) use in the elderly is associated with increased hospital admissions, mortality and cost. The Center for Medicare & Medicaid Services (CMS) has incorporated measures addressing these issues into their Star Ratings program. As measures evolve, evaluation of best practices is necessary. Objectives of this study were to determine if comprehensive medication reviews (CMRs) directed at non-adherent Medicare patients increase adherence rates and define the impact of HRM clinical mailings on the rate of patients filling the same HRM twice. **Methods:** A retrospective analysis evaluated a difference in adherence, change in proportion of days covered (PDC), in the following CMS measured classes: renin angiotensin system antagonists, oral diabetes agents, and statins six months pre/post CMR receipt date. Non adherent (PDC <0.80) groups were: Group 1 received no interventions (n=19), Group 2 received a targeted medication review (TMR) (n=86), Group 3 received a CMR (n=101) and Group 4 received a CMR and a TMR (n=31). A separate analysis was used to determine if members rates of filling the same HRM twice differed between those who did (n=2936) and did not (n=2874) have their HRM prescribers receive a clinical mailing detailing the HRM prescribed and possible alternatives. **Results:** The result of PDC (pre vs post) follow: Group 1 (0.678 vs 0.802), Group 2 (0.637 vs 0.812) (p<0.05), Group 3 (0.668 vs 0.793), Group 4 (0.658 vs 0.752). For the HRM analysis, the rates of having a second fill of the same HRM follows: mailed group (43.6%) (p<0.05) and non-mailed group (56.4%). **Conclusion:** CMRs did not improve rates of adherence, while only receiving a TMR did. Sending HRM prescribers detailed mailings reduced the rate of patients second fill of the same HRM.

Learning Objectives:

Describe the benefits of improving medication adherence across a population to both patients and their Medicare Advantage Prescription Drug Plan.

Describe performance measures included in CMS Star Ratings as they relate to medication adherence and high risk medication use in the elderly.

Self Assessment Questions:

Which of the following Medicare Part D measures is weighted the most?

- A Medication therapy management program CMR completion rate
- B Medication therapy management program TMR completion rate
- C Medication adherence to insulin
- D Medication adherence to statins

Which of the following is true regarding Medicare Advantage Prescription Drug Plans?

- A Members can freely switch to Medicare plans earning ≥ 4 stars out of 5
- B Bonus reimbursement for additional benefits to patients is flat after 2017
- C Star ratings are measured using the previous year's data
- D The HRM measure has transitioned from a Star Rating to a display

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-346L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PERCEIVED BARRIERS TO PHYSICAL ACTIVITY IN PATIENTS WITH DIABETES WHO SET A 6-MONTH MOVEMENT-RELATED GOAL

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Purpose: (1) characterize themes related to patient-perceived barriers to achieving a 6-month movement-related goal in patients with diabetes; (2) describe patterns between patient-specific characteristics and achievement of patients individual movement-related goals; and (3) identify patient-reported motivating factors for setting a 6-month movement-related goal. **Methods:** Used Patients will be recruited from a pharmacist-run, diabetes-focused ambulatory care practice located within an independent community pharmacy. The directing pharmacist and pharmacy resident facilitate the practices accredited diabetes education program. Patients attend six individual follow-up visits with the pharmacist following program completion and set 6-month diabetes self-management goals during the first follow-up appointment. Patients seen at the practice between August 2013 and August 2016 will be included in this study if they were 18 years of age or older, had a diagnosis of diabetes/prediabetes, completed the diabetes education program, attended a minimum of five individual follow-up appointments, and set a movement-related goal. This qualitative study will use audio-recorded semi-structured telephone interviews to assess patient-perceived barriers to achieving movement-related goals and identify the primary motivating factors for setting these goals. Patient-reported demographic and diabetes-related information will also be obtained during the interview. Audio-recordings will be professionally transcribed and independently coded by two study investigators using MaxQDA to characterize themes related to patient-perceived barriers. The two coders will reconcile any differences in coding following the completion of the interviews. Statistical Package for the Social Sciences will be used to generate descriptive statistics of patient-specific characteristics. This study is pending approval by the Institutional Review Board. **Results Summary:** These results are currently pending. **Conclusions:** Pharmacists understanding of patients barriers, motivating factors, and patient-specific characteristics related to movement will enable pharmacists to provide more proactive, individualized care for patients with diabetes.

Learning Objectives:

Describe patient-perceived barriers to engaging in exercise for adult patients with diabetes.

Identify patient-specific characteristics obtained during the telephone interview with study participants.

Self Assessment Questions:

Which of the following have been reported in the literature as patient-perceived barriers to physical activity?

- A Fear of hypoglycemia
- B Feeling in control of their diabetes
- C High level of fitness
- D Access to exercise facilities

Which of the following patient-reported information was collected during the telephone interview with study participants?

- A Free T4 level
- B Occupation
- C Fasting lipid panel
- D Surgical history

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-411L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

FACTORS PREDICTING 30-DAY HOSPITAL READMISSION AFTER KIDNEY TRANSPLANT

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Hospital readmissions after kidney transplant have been associated with increased morbidity, mortality, decreased quality of life, and increased healthcare costs. The objective of this study was to identify clinical factors associated with 30-day hospital readmission post kidney transplant at an academic medical center. This study was a retrospective, single-center cohort study. A total of 224 patients were included who received a kidney transplant between July 1, 2014 and October 12, 2016. A total of 59 (26.3%) transplant recipients were readmitted within 30 days of discharge. Readmission rates did not differ between age, race, or initial hospital length of stay. Diabetes as the cause of ESRD and dialysis prior to transplant were associated with differences in 30-day readmission. Diabetes as the cause of ESRD was associated with a readmission rate of 35.7% compared to 22.1% in those without diabetes ($p=0.032$). Patients on dialysis prior to transplant had a readmission rate of 28.2% compared to those not on dialysis 5.6% ($p=0.037$). There was a trend towards lower readmission rates in living donor recipients versus cadaveric, but the difference was not statistically significant. There was a trend towards higher 30-day readmission rates for patients with history of CAD, delayed graft function, subtherapeutic tacrolimus level at discharge, level of education less than a college degree, treatment for donor positive culture and treatment for urinary tract infection within 30 days post-transplant; however these were not found to be statistically significant factors. Interestingly, patients discharged on the weekend had a lower 30-day readmission rate compared to those discharged on weekdays (16.7% vs. 30.9%; $p=0.024$). In our population, diabetes as the cause of ESRD and dialysis prior to transplant had a statistically significant higher 30-day readmission rate. These factors may be beneficial areas of intervention to reduce readmission rates, improve patient outcomes, and reduce healthcare costs.

Learning Objectives:

List outcomes associated with early hospital readmission after kidney transplantation.

Describe risk factors associated with early hospital readmission after kidney transplantation.

Self Assessment Questions:

Early hospital readmission after kidney transplantation has been associated with which of the following?

- A: Increased risk of allograft loss
- B: Decrease in overall healthcare costs
- C: Improved quality of life
- D: Reduced mortality

Which of the following may be risk factors for early hospital readmission after kidney transplantation?

- A: Short time spent on transplant wait list
- B: Recipient of kidney from a living donor
- C: Delayed graft function
- D: Minimal dialysis exposure prior to transplantation

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-432L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

NEPHROTOXICITY ASSOCIATED WITH CONCOMITANT VANCOMYCIN AND PIPERACILLIN/TAZOBACTAM VERSUS CONCOMITANT VANCOMYCIN AND CEFEPIME THERAPY

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Purpose: Acute kidney injury (AKI) has been associated with the use of vancomycin and antipseudomonal -lactam antibiotics such as piperacillin/tazobactam and cefepime which are typical empirical combination therapies for drug-resistant pathogens. Research on this topic has exhibited a growing concern for an increased risk of AKI with the antibiotic combination of vancomycin and piperacillin/tazobactam (VPT) compared to that of vancomycin and other antipseudomonal -lactam antibiotics. The primary objective of this study was to compare the incidence of AKI with VPT compared to vancomycin and cefepime (VC) at the study institution. Methods: This was an institutional review board-approved, retrospective chart review of patients ≥ 18 years of age who received concomitant VPT or VC between January 1, 2014 and June 30, 2016 to compare the incidence of AKI, defined as a serum creatinine (SCr) increase ≥ 0.3 mg/dL or ≥ 1.5 fold increase from baseline. Using a random number generator, patient charts were reviewed until 50 patients were included in each study group. Patients were included if they received ≥ 48 hours of antibiotic combination therapy. Exclusion criteria included baseline SCr ≥ 1.3 mg/dL or $\geq 50\%$ change in SCr within 24 hours of initiating antibiotic therapy, non-extended infusion piperacillin/tazobactam dosing, dialysis at time of antibiotic initiation, chronic kidney disease stage 4 or higher, antibiotic combination change prior to de-escalation, and structural kidney disease (defined as less than two functional kidneys). Prisoners and pregnant patients were excluded. Data collected included patient demographics, renal function, infection diagnosis, antibiotic regimen, duration of therapy, hospital location at antibiotic initiation, comorbidities, use of other nephrotoxic agents, hospital length of stay, development of Clostridium difficile, and time to AKI. Nominal data was analyzed using X2 and continuous data was analyzed using a t-test.

Results/conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Define acute kidney injury (AKI) severity based on the RIFLE (Risk, Injury, Failure, Loss, and ESRD) criteria

Review the current literature surrounding the incidence of AKI with the use of vancomycin and antipseudomonal -lactam antibiotics

Self Assessment Questions:

What severity of AKI does a 47 y/o male with a baseline serum creatinine of 0.9 mg/dL now meet after being in the hospital for 2 days with an increased serum creatinine of 2.1 based on the RIFLE criteria?

- A: Risk
- B: Injury
- C: Failure
- D: Loss

Per the 2014 retrospective study conducted by Gomes and colleagues, which empiric antibiotic regimen was associated with the highest risk of developing AKI?

- A: Vancomycin monotherapy
- B: Piperacillin/Tazobactam monotherapy
- C: Piperacillin/Tazobactam plus Vancomycin
- D: Cefepime plus Vancomycin

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-533L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATING NALOXONE ADMINISTRATIONS RETROSPECTIVELY TO IMPROVE OPIOID PRESCRIBING PATTERNS AND PATIENT SAFETY IN A COMMUNITY HOSPITAL SETTING.

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ABSTRACT:Statement of Purpose:Overdose by opioids is a preventable and potentially lethal condition which can arise from prescribing practices, inadequate patient understanding, medication misuse, and errors in drug administration. Our purpose is to evaluate naloxone as a trigger tool to identify any areas for improvement in our institutions opioid prescribing. After reviewing our naloxone use we plan to implement changes to our opioid prescribing patterns to improve patient safety.Methods: We conducted a retrospective medication use evaluation of all naloxone administrations within a 6 month period, May - October 2016th. A query was conducted and resulted in 137 administrations of naloxone and 70 unique patients. Thorough manual chart review was done to evaluate each administration and key clinical factors that led to each administration were documented. All patients were categorized based on specific factors to help identify prescribing practices including, but not limited to, the unit which naloxone was most used, opioids given in the past 24 hours, benzodiazepines given in the past 24 hours, lung/liver/kidney dysfunction, opioid tolerant vs opioid nave. Patients that were excluded included emergency room patients, naloxone for itching, and critical access hospital patients. Patient populations were split into medicine floors and peri-operative patients. Any of the adverse event data gathered will be used to aid in implementation of policies and physician education that benefit patient safety. Summary of Results to Support Conclusion/Conclusions Reached:Data collection and analysis are currently in progress. Results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize risk factors associated with potential inappropriate opioid prescribing.

List common trigger tools and methods used to prevent under reporting of adverse drug events.

Self Assessment Questions:

Which patient would be at highest risk for an opioid induced respiratory depression?

- A 54 year old male with a history of atrial fibrillation
- B: 74 year old female with a history of sleep apnea
- C: 23 year old patient with a history of diabetes mellitus type 2
- D: 36 year old patient with a history of chronic cellulitis

Which "trigger tool" would be an effective measurement of insulin related adverse drug events?

- A D50W injection
- B Flumazenil
- C Phytonadione
- D Diphenhydramine

Q1 Answer: B Q2 Answer: A

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IMPLEMENTATION AND EVALUATION OF AN OUTPATIENT INVENTORY MANAGEMENT SYSTEM

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Statement of Purpose:The objective of this project is to implement and evaluate an outpatient inventory management system at a Veterans Affairs hospital. Current issues facing the facility's outpatient pharmacy are lack of a perpetual inventory, daily manual ordering of stock, and partial fills. **Statement of methods used:**Request for funding was submitted and secured in October 2016. Contracting of inventory management system was completed in December 2016. A team was formulated with key stakeholders to identify process optimization opportunities and plan for installation. A wall to wall inventory of the outpatient pharmacy to determine cost of on-hand inventory, time study of the ordering process, and collection of partial fills/stock-out data were completed prior to system installation. Partial fills and stock-outs were collected manually from the ScriptPro data terminal daily for four weeks. Time study of the ordering process was collected daily for two weeks as well. Training materials and plan for education of staff will also be completed prior to implementation. Post implementation, on-hand outpatient inventory cost, time study of the ordering process and assessment of partial-fills and stock-outs will be completed. Summary of results to support conclusion:PendingConclusions reached:Pending

Learning Objectives:

Identify benefits of implementation of an outpatient inventory management system

Discuss considerations to be made prior to installation of an outpatient inventory management system

Self Assessment Questions:

1.Which of the following are ideal benefits for implementation of an outpatient inventory management system?

- A Increased real-time visibility of inventory on hand
- B: Reduction of excess inventory
- C: Automated generation of orders based on targeted inventory level:
- D: All of the above

2.Which of the following considerations must be made prior to installation of an outpatient inventory management system?

- A Workflow considerations
- B Determination of par levels
- C Key distributors and their potential to interface with the inventory n
- D All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-861L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF EFFECTIVENESS IN PHARMACIST NALOXONE DISTRIBUTION ON PATIENTS AT THE HUNTINGTON, WV VA MEDICAL CENTER

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Purpose of the Research: Numerous efforts have been made to combat the growing issue of opioid misuse and abuse. The CDC Guidelines for Prescribing of Opioids for Chronic Pain 2016 seek to radically change the use of opioids in clinical practice. A recommendation provided by these guidelines is to incorporate ways to mitigate risk into patients' opioid management plans, including offering naloxone when needed. The purpose of this research is to evaluate the effectiveness in pharmacist naloxone distribution to patients at an increased risk for opioid overdose. The adoption of current CDC recommendations at the Huntington VA Medical Center will also be evaluated. These include, ensuring patients have an indication for their long-term opioid therapy, appropriate use of non-pharmacologic and non-opioid therapies prior to opioid initiation, review of state prescription drug monitoring programs (PDMP) periodically while the patient is on opioid therapy, and use of urine drug screens (UDS) at least annually. Methods: A retrospective chart review to evaluate naloxone distribution rates by profession of prescriber as well as compliance with the new CDC 2016 pain management guidelines. Results: Data is currently being collected and analyzed. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review the recommendations included in the Centers for Disease Control and Prevention (CDC) Guideline for Prescribing Opioids for Chronic Pain.

Identify your own professional opinion related to the CDC Guideline for Prescribing Opioids for Chronic Pain and discover how you may incorporate the recommendations into your everyday pharmacy practice.

Self Assessment Questions:

According to the CDC Guideline for Prescribing Opioids for Chronic Pain, what amount of morphine milligram equivalents per day should be avoided:

- A: > or equal to 50 MME/day
- B: > or equal to 75 MME/day
- C: > or equal to 90 MME/day
- D: > or equal to 125 MME/day

According to the CDC Guideline for Prescribing Opioids for Chronic Pain, Naloxone should be offered when:

- A: Patient has a history of overdose and/or substance use disorder
- B: Patient taking an opioid dose greater than or equal to 50 MME/day
- C: Patient concurrently using an opioid and benzodiazepine
- D: All of the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-398L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION OF AN ANTIMICROBIAL STEWARDSHIP ORDER SET FOR THE TREATMENT OF CLOSTRIDIUM DIFFICILE INFECTION IN HOSPITALIZED PATIENTS

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Purpose: In 2011, 500,000 infections were caused by *Clostridium difficile* (*C. difficile*) in the United States. Approximately 83,000 patients experienced at least one recurrence and 29,000 expired within 30 days of the initial diagnosis. Treatment of *Clostridium difficile* infection (CDI) is based on clinical data and the patient's history of CDI. Patients are often incorrectly stratified and inappropriately treated leading to recurrent infections. The purpose of this study is to identify discrepancies in the stratification and treatment of CDI in hospitalized patients before and after the implementation of a standardized antimicrobial stewardship order set. Methods: This study will retrospectively evaluate compliance with Infectious Diseases Society of America (IDSA) guidelines in the prescribing of antimicrobials for CDI before and after the implementation of a *C. difficile* order set. Two patient groups will be retrospectively evaluated. The first group will be analyzed before implementation of the order set from May 1, 2016 to August 31, 2016. The second group will be analyzed after implementation of the order set from November 1, 2016 to January 31, 2017. Patients will be selected based on the date of the positive polymerase chain reaction (PCR) assay for *C. difficile* toxin. Patients will be included if they are greater than or equal to 18 years of age and have a new, confirmed clinical diagnosis of CDI with a positive PCR assay. Data collection will include: baseline demographics and characteristics, pertinent medication history, pertinent laboratory data, patient history of CDI, overall compliance with the order set, transfer to a higher level of care, intensive care unit length of stay, surgical intervention, radiologic findings, colo-rectal surgeon consultation, infectious diseases consultation, and 30-day readmission rate. Results: Results and conclusions will be presented at the Great Lakes Residency Conference pending completion of data collection and analysis.

Learning Objectives:

Review the Infectious Diseases Society of America (IDSA) classifications of patient disease state severity for *Clostridium difficile* infection (CDI).

Describe the appropriate course of antimicrobial treatment based on the severity of CDI.

Self Assessment Questions:

Which of the following is a risk factor for developing CDI?

- A: Advanced age (≥ 65 years)
- B: Antimicrobial therapy
- C: Duration of hospital stay
- D: All of the above

What is an appropriate treatment regimen for a patient diagnosed with an initial episode of severe CDI?

- A: Vancomycin 125mg PO q6h for 10 days
- B: Metronidazole 500mg PO q8h for 10 days
- C: Vancomycin 500mg PO q6h for 14 days
- D: Vancomycin 125mg PO q6h + Metronidazole 500mg IV q8h for 14

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-578L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DEVELOPMENT OF A TOOL FOR PREVENTION OF INPATIENT FALLS BASED ON BEERS CRITERIA AND STOPP: A PILOT STUDY.

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Purpose: Falls are a leading source of accidental death in people greater than age 65. The Beers criteria and Screening Tool of Older Persons Prescriptions (STOPP) identify potentially inappropriate medications (PIMs) in patients age 65 or older. However, the list of drugs provided by these tools is exhaustive and primarily focuses on outpatient and long-term care settings. This study aims to create a more focused list of drugs to target for discontinuation/medication optimization within an inpatient population at a large community hospital. **Methods:** This study is a two phase study. The first phase will involve the development of a decision support tool (DST) to assist pharmacists in recommending interventions regarding PIMs. A literature review and a voluntary survey of admitting prescribers will be performed to investigate prescribing practices impacting PIM use. Medications published in the Beers/STOPP criteria will be reviewed for PIMs with the highest falls risk and compared to survey results. Analysis of this data will be used to build the DST to guide PIM reduction. During phase two, the DST will be utilized for a 4 week pilot study within an inpatient community hospital. After completing standardized education, pharmacists will recommend interventions identified by DST to the attending physician to reduce PIMs. Upon the conclusion of this trial period, data will be collected to identify pharmacist satisfaction, ease of use, workflow impact and the number of interventions made to evaluate tool utility in a community setting. **Results:** Phase 1 was completed January 2017. Physician results identified concern for falls for patients who were >64, hospitalized/had a fall in the previous year, or were on at least 1 PIM. From this and the literature, 5 major drug classes were identified for inclusion on the falls DST. **Conclusion:** The utility of a focused DST will be completed Spring 2017.

Learning Objectives:

Explain how an inpatient fall will impact hospital stay and increase costs
Recognize which medications have the highest risk of causing falls

Self Assessment Questions:

Which medication class increased the risk of falls the most?

- A: Benzodiazepines
- B: Selective serotonin reuptake inhibitor
- C: Sedatives
- D: Antipsychotics

What is the total medical cost of fall-related injuries estimated to be in 2020?

- A: \$30 billion
- B: \$35 billion
- C: \$40 billion
- D: \$45 billion

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-889L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF A LIFETIME DOSE FOR PLATINUM CHEMOTHERAPEUTIC AGENTS: A RETROSPECTIVE REVIEW

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Purpose: Platinum based antineoplastic agents are commonly used for the treatment of a variety of cancers. With the increased use of platinum agents, there is an increased risk of patients developing hypersensitivity reactions. Recently published literature suggests a higher incidence of hypersensitivity reactions when a patient is given greater than 4 cycles of carboplatin or 9 cycles of oxaliplatin. The purpose of this study is to identify a potential lifetime dose of carboplatin and oxaliplatin and to determine potential risk factors for these hypersensitivity reactions.

Methods: This is a retrospective chart analysis of all patients being treated with platinum agents from 2008 to 2016. This study will compare patients who developed a hypersensitivity reaction to a control group that did not develop a hypersensitivity reaction. All patients who received platinum based antineoplastic agents will be identified through Cerner computer system. Patients will be excluded if they meet one of the following criteria: less than 18 years of age, received less than 9 cycles of oxaliplatin, received less than 4 cycles of carboplatin, or transferred from an outside facility for continuation of care. Data to be collected and analyzed includes age, gender, weight, presence of preexisting allergies indication for treatment, renal function, prior or current exposure to platinum containing agents, chemotherapy dosing regimen, presence of a hypersensitivity reaction, use of pre-medications for mitigation of treatment reactions, number of attempts or trials before determining treatment termination, and total dose of platinum agent received. Patients will further be categorized based on total dose received and evaluated for potential risk factors for development of hypersensitivity reactions. The primary outcome will be determined by the average total dose at which the majority of patients experience a hypersensitivity reaction. Statistical methods to be determined. **Results and Conclusions:** In Progress

Learning Objectives:

Discuss the potential for a lifetime dose of the platinum agents Oxaliplatin and Carboplatin.

Identify potential risk factors and clinical outcomes of delayed hypersensitivity reactions.

Self Assessment Questions:

Based on the literature, what is the average number of cycles associated with delayed hypersensitivity reactions with Oxaliplatin?

- A: After the first cycle
- B: 3
- C: 9
- D: 20

What is the consequence of delayed hypersensitivity reactions from platinum agents?

- A: Neuropathy
- B: Delaying necessary treatment
- C: Neutropenia
- D: Permanent rash

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-457L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PATTERNS OF PRESCRIBING AND MONITORING OF PALBOCICLIB

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Purpose: Palbociclib (Ibrance) is a cyclin-dependent kinase 4 and 6 inhibitor that is indicated for the treatment of estrogen receptor (ER) positive, human epidermal growth factor receptor 2 (HER2) negative advanced or metastatic breast cancer in combination with either letrozole or fulvestrant. Previous studies have shown that the most common adverse effect of this medication is hematologic toxicity, in particular neutropenia. Patients can also experience non-hematologic toxicities from this medication; however, rates of experiencing hematologic toxicities are a lot higher than those for non-hematologic toxicities. There are specific manufacturer recommendations about when and how to dose adjust palbociclib based on the absolute neutrophil count. The purpose of this retrospective, single cohort study is to determine if patients with ER+, HER2-, advanced breast cancer are receiving dosing adjustments and monitoring based on manufacturer recommendations at Rush University Medical Center (RUMC).

Methods: A retrospective chart review was conducted from February 2015 to December 2016. All women who were at least 18 years old, had ER+, HER2-, advanced breast cancer, and were receiving palbociclib were included. Exclusion criteria included patients with brain metastases and any patient who was actively enrolled in a palbociclib study. The primary endpoint of this study was to identify the number of patients who were dose adjusted for all toxicities. Secondary endpoints include: identifying the number of patients who were dose adjusted for hematologic toxicities, identifying the number of patients who experienced neutropenia, duration of therapy, progression free survival, and adherence to manufacturer monitoring recommendations.

Results: Results are pending. **Conclusion:** Conclusions are pending statistical analysis.

Learning Objectives:

Review manufacturer monitoring recommendations of palbociclib.
Identify appropriate dosing adjustments of palbociclib based off manufacturer recommendations.

Self Assessment Questions:

A complete blood count should be monitored at what time periods in patients who are receiving palbociclib?

- A: Before initiation of therapy
- B: Before the start of each cycle
- C: On day 14 of the first two cycles
- D: All of the above

AK is a 64 year old female who is on her 5th cycle of palbociclib for ER+, HER2-, advanced breast cancer. She is currently taking palbociclib 125 mg/day for 21 days followed by 7 days off medication.

- A: The patient is afebrile and feels fine so cycle 5 day 1 can be started
- B: The patient should wait two weeks and continue at the same dose
- C: The patient should resume taking palbociclib when her absolute neutrophil count is above 1500
- D: Palbociclib should be discontinued in this patient

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-444L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF PHARMACIST COUNSELING ON CONGESTIVE HEART FAILURE 30-DAY READMISSIONS AT A COMMUNITY HOSPITAL

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Purpose: Congestive heart failure (CHF) is the leading cause of mortality in the United States. CHF affects 5.7 million adults and is responsible for one in nine adult deaths. CHF patient hospital readmission rates remain high; the current national average for CHF 30-day readmission rates is 21.9%. The purpose of this study is to determine the incidence of 30-day readmission in CHF patients before and after implementation of pharmacist provided inpatient counseling. **Methods:** This is a retrospective, single center, cohort study, involving chart review from April 2016 to December 2016. A new clinical service wherein pharmacists provide inpatient counseling to CHF patients was implemented in August 2016. This study will evaluate the impact of this new service by comparing the rate of 30-day hospital readmission between CHF patients who received pharmacist inpatient counseling and CHF patients who did not receive counseling. The primary outcome is hospital readmission within 30 days after discharge. Secondary outcomes include the amount of time required by the pharmacist to conduct an inpatient counseling session, number of pharmacist interventions, emergency department visits within 30 days after discharge, and factors associated with prevention of 30-day readmission. Eligible patients for inclusion were at least 18 years old and admitted to the hospital with a history or admission diagnosis of heart failure. Prisoners, pregnant women, patients with altered mental status, and patients discharged to skilled nursing facilities or long-term care facilities were excluded. Chi-square test, student's t test, and logistic regression analysis will be utilized to evaluate primary and secondary endpoints, as appropriate. **Results and Conclusions:** Data collection and analysis are ongoing. There are 254 patients (127 patients in each group) included in the study based on inclusion and exclusion criteria.

Learning Objectives:

Describe the need for pharmacist involvement in management of congestive heart failure patients at a community hospital
Identify the role of the pharmacist conducting an inpatient patient counseling at a community hospital

Self Assessment Questions:

1. Based on available literature, what are the potential benefits to patients from pharmacist provided patient education services?

- A: Decreased readmission rates through increased medication errors
- B: Increased medication compliance through increased patient understanding
- C: Decreased emergency department visits through decreased medication errors
- D: Increased medication errors through increased patient health literacy

2. What is the role of a pharmacist conducting inpatient counseling service for congestive heart failure patient?

- A: Administer newly started congestive heart failure medications while the patient is inpatient
- B: Make appropriate changes in patient congestive heart failure therapy
- C: Conduct a medication reconciliation, make appropriate recommendations
- D: Schedule a follow up visit to address continued medication compliance

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-765L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION OF A PHARMACIST-DRIVEN VENOUS THROMBOEMBOLISM RISK ASSESSMENT TOOL AT A COMMUNITY TEACHING HOSPITAL: A QUALITY IMPROVEMENT INITIATIVE PROJECT

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Background: Venous thromboembolism (VTE), which includes deep vein thrombosis (DVT) and pulmonary embolism (PE), is a leading complication among hospitalized patients. At Wheaton Franciscan St. Joseph Hospital pharmacists do not have a standardized approach to addressing pharmacological VTE prophylaxis. The primary objective of this study is to design and implement a pharmacist driven VTE risk assessment tool for admitted medical patients. The secondary objective is to determine the appropriate usage of pharmacologic VTE prophylaxis in hospitalized patients using a pharmacist led VTE risk assessment tool. The development of a pharmacist driven risk assessment tool can improve awareness in providing chemoprophylaxis to high-risk patients.

Methods: The Institutional Review Board approved this single center study. The electronic medical record will be utilized to collect patient data. Pre implementation data will be collected for 100 patients from April 2016 - January 2017 and post implementation data will be collected for 100 patients from February 2017 - April 2017. The following data will be collected: Padua risk assessment score, and its components, such as history of VTE, reduced mobility, active cancer, history of thrombophilic condition, recent trauma or surgery, obesity, acute MI/ischemic stroke, ongoing hormonal treatment, heart and/or respiratory failure, lower extremity arthroplasty, and spinal cord injury with paresis. All previously mentioned parameters will be recorded without patient identifiers and maintained confidentially. Pharmacists will use the risk assessment tool to determine the patients need for pharmacologic VTE prophylaxis and convey their recommendation to the physician within 24 hours of admission by any form of communication they deem clinically appropriate. This will ensure all patients have optimized pharmacological VTE prophylaxis. Pharmacists will receive an education guide with instructions for documentation. Statistical analysis will be performed on the parameters mentioned above using a chi-squared test for categorical data and t-test for continuous variables.

Learning Objectives:

Identify risk factors for venous thromboembolism (VTE)

Describe the utility of the Padua Prediction Score and pharmacological VTE prophylaxis

Self Assessment Questions:

Which of the following is NOT assessed by the Padua Prediction Score?

- A Age
- B Obesity
- C Active Bleed
- D Recent trauma or surgery

Which of the following is risk factor for venous thromboembolism?

- A Malignancy
- B Prior VTE
- C Immobility
- D All of the above are risk factors for VTE

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-417L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF THE USE OF PROTHROMBIN COMPLEX CONCENTRATES AT UNIVERSITY OF ILLINOIS HOSPITAL

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Purpose

Management of patients presenting with anticoagulation-related major bleeds includes 3-factor and 4-factor prothrombin complex concentrates (3F-PCC, 4F-PCC), and recombinant activated factor VII (rFVIIa). The efficacy and safety of 4F-PCC along with its use in FXa inhibitor-related major bleeds is limited. Our goal is to examine the safety and efficacy of its use for patients on anticoagulation requiring urgent reversal for major bleeding or an invasive procedure.

Methods

This study is a retrospective chart review of all patients receiving PCC from May 2016 to April 2017. A patient list generated through Cerner prescribing reports for all PCC administration was utilized. Patients' electronic medical records were reviewed from the day of admission until hospital discharge to obtain all outcomes. The primary objective is to examine the efficacy of PCC products for warfarin or FXa inhibitor reversal. It will be determined for warfarin based on a decrease in INR to ≤ 1.3 at 0.5 hours after infusion of PCC product and ≥ 1 fresh frozen plasma (FFP) within 12 hours after administration of PCC. For FXa inhibitors, primary outcomes will be based on clinical assessment of bleeding cessation and ≥ 1 FFP within 12 hours of administration. Secondary objectives include the safety of PCC products such as the development of thrombosis. Additional secondary objectives are the time to order and administration of PCC after the implementation of the Antithrombotic Reversal Guideline and Order Set at our institution.

Results

As of January 2017, 14 patients (warfarin, n=10; rivaroxaban, n=2, no anticoagulation therapy, n=2) received PCC products at UIH. Six of the warfarin patients achieved the primary outcome of INR to ≤ 1.3 . Three patients required FFP following PCC administration (warfarin, n=2; rivaroxaban, n=1). One out of 2 patients on rivaroxaban achieved bleeding cessation. Two patients developed thromboembolic events (bowel ischemia) and died during the study.

Learning Objectives:

Identify the current methods of anticoagulation reversal available.

Describe factors that assist in measuring success of anticoagulation reversal.

Self Assessment Questions:

Which of the following methods is not currently utilized to reverse anticoagulation therapy?

- A 3F-PCC alone.
- B 3F-PCC with rFVIIa.
- C 4F-PCC alone.
- D 4F-PCC with rFVIIa.

The following is the primary method used to measure effectiveness of PCC reversal of warfarin:

- A INR reduction to ≤ 1.3
- B Clinical assessment of hemostasis
- C FFP administration
- D Phytonadione (vitamin K) administration

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

CONVERSION OF PATIENTS FROM INSULIN U-100 TO U-500 AND THE EFFECT ON GLYCEMIC CONTROL

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Purpose: Insulin U-500 is being prescribed more frequently due to rising rates of insulin resistance. U-500 has many safety issues including a lack of consensus regarding the conversion method from U-100 insulin. This predisposes patients to the risks of over or under treatment. Common methods include 1:1 conversion of the total daily dose of U-100 to U-500 for patients with hemoglobin A1c (HbA1c) greater than or equal to 8 percent, and dose reduction of 10-20 percent for patients with lower initial HbA1c. This study will identify patients converted from U-100 to U-500 regular insulin and evaluate the safety and efficacy on glycemic control in type 2 diabetic patients. **Methods:** This study is a retrospective chart analysis of patients who were converted from insulin U-100 to U-500 in the outpatient setting at a single institution from January 1, 2013 to May 31, 2016. The electronic medical record system was used to identify patients. The following data was collected: age, gender, weight, onset of diabetes, glucose level, HbA1c and method of U-100 to U-500 insulin conversion. Laboratory and patient-reported hypoglycemia, defined as blood glucose less than or equal to 70 mg/dL, and hyperglycemia, defined as pre-prandial blood glucose levels greater than 130 mg/dL and postprandial blood glucose levels greater than 180 mg/dL, were also identified. Provider documentation was reviewed to determine if alternate etiologies of hypoglycemia and hyperglycemia were identified. Once the data was collected, patients were categorized by method of conversion and then compared by rates of hypoglycemia, in range blood glucose values, and hyperglycemia.

Learning Objectives:

Discuss the pharmacokinetics of U-500 insulin compared to U-100 insulin.

Describe how to convert patients from U-100 insulin to U-500 insulin.

Self Assessment Questions:

Which one of the following represents the correct peak time and duration of action in a single dose of U-500 insulin?

- A: Peak 0.5-3 hours and duration 3-5 hours
- B: Peak 2-4 hours and duration 5-8 hours
- C: No pronounced peak and duration of 10-18 hours
- D: Peak 5-7 hours and duration of 8-24 hours

For the following patient case which one of the following represents an appropriate conversion method when transitioning this patient from U-100 insulin to U-500 insulin therapy? A 58-year old man pr

- A: Dose for dose conversion
- B: Consider reducing the U-500R dose by 10-20%
- C: Consider increasing the U-500R dose by 10-20%
- D: This patient does not need to be transitioned to U-500R insulin the

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-556L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

RISK OF NOSOCOMIAL INFECTIONS WITH ETOMIDATE USE

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Statement of the Purpose: Etomidate is a short-acting non-barbiturate hypnotic, which many consider to be the gold standard for sedative induction in the rapid sequence intubation (RSI) of critically ill patients. Due to the inhibition of cortisol production, etomidate can cause adrenal suppression, which may last as long as 48 hours after a single dose. Despite these findings, it is unclear whether this has an adverse effect on patient clinical outcomes. The purpose of this study is to determine whether there is a correlation with etomidate use and the incidence of nosocomial infections compared to ketamine, propofol or no agent in patients requiring RSI in the emergency department and inpatient setting. **Statement of Methods Used:** This is a retrospective, cohort study of hospitalized patients who developed nosocomial infections within 1-5 days after receiving either a dose of etomidate or ketamine, propofol or no agent for RSI at Loyola University Medical Center. This data was collected from past electronic medical records of intubated patients from Loyola's Emergency Department, intensive care units and general medicine floors between July 2014 and July 2016. Study participants were excluded if they were intubated due to sepsis, had a burn injury, or were intubated for an elective procedure. The primary endpoint is the incidence of nosocomial infections and sepsis in patients within 1-5 days who were administered etomidate versus those patients who did not receive etomidate. Secondary outcomes include number of mechanical ventilator free days within 28 days, 30-day mortality, length of hospital stay, length of intensive care unit stay, and type of nosocomial infection. **Summary of Results to Support Conclusions:** Pending **Conclusions Reached:** Pending

Learning Objectives:

Discuss the pharmacologic properties of etomidate

Review the results of the study Risk of Nosocomial Infections with Etomidate Use

Self Assessment Questions:

Which of the following is a pharmacologic characteristic of etomidate:

- A: Transient adrenal suppression
- B: Slow onset of action
- C: Long duration of action
- D: Hemodynamic instability

What is the primary endpoint in the study Risk of Nosocomial Infections with Etomidate Use:

- A: Number of hospital admissions post intubation
- B: 30-day mortality
- C: Incidence of nosocomial infections
- D: Length of hospital stay

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-516L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPROVED COMMUNICATION WITH MEDICATION HOLD ORDERS

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At this community teaching health system, the intent to hold a medication is communicated in a variety of ways including verbally between a provider and a nurse, in a progress note, or by an electronic communication order. Each method of communication has potential for error. Electronic and verbal communication orders between the provider and nurse can easily be overlooked or not be passed on from one shift to another. The purpose of this project is to develop and implement a process in the electronic health record (EHR) to allow providers to enter a medication hold order, thereby informing the healthcare team of the intent to hold and prevent other users from ordering, verifying, or administering the medication when the intent is to hold. A taskforce was formed comprised of inpatient pharmacists and information technology specialists, with input from specialized physician groups. Background information on the workflows of other institutions and possible EHR functionality was gathered. A list of medications which were created for hold orders which were approved by physician groups. The EHR build for alerts were tested to confirm they were firing appropriately and education was provided to nurses, physicians, physician assistants, nurse practitioners, and pharmacists. The number of medications which were intended to be held but were given will be compared before and after implementation. Data will be gathered on the number of times the hold order was utilized and the number of times the alert fired. Final conclusions and results will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the benefits of hold orders in the hospital setting.
Describe potential complications and barriers to implementing hold orders.

Self Assessment Questions:

Which of the following is true?

- A: Hold orders will improve communication in the healthcare team
- B: Hold orders will create more alerts
- C: Hold orders cannot be overridden
- D: A and B

Which of the following can be a potential complication(s) of class hold orders?

- A: Standardizing the communication of intent to hold
- B: Misunderstanding of what medications are included in a class hold
- C: Assuring new medications within a drug class are included in class
- D: B and C

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-959L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ASSESSMENT AND REMOVAL OF INAPPROPRIATELY DOCUMENTED PENICILLIN ALLERGIES AT A VETERANS AFFAIRS MEDICAL CENTER

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Purpose: Beta-lactams are commonly associated with immediate hypersensitivity reactions. On average, 10 percent of the general population have a reported history of a penicillin allergy, yet only 10 percent of those individuals are truly allergic. Assessing these patients' allergies is critically important, and especially for those with a serious infection in which beta-lactams are the treatment of choice. For these patients, detailed medication and allergy histories may lead to the decision of antibiotic dose challenges or allergy consult to remove inappropriately documented allergies and safely administer beta-lactams in the future. **Methods:** This study consists of a pre- and post-implementation data collection for patients with documented allergic reactions to penicillins within the Clement J. Zablocki VA Medical Center. The intervention consists of a new note template for pharmacists to use as part of antimicrobial stewardship activities to identify patients on suboptimal antimicrobial therapy due to a listed penicillin allergy. Following the note template, the pharmacist, and other providers caring for the patient, can evaluate whether the allergy is likely a true allergy and determine the appropriate therapy for that patient. After the pharmacist completes the note template, they will alert the primary provider to their recommendation, which includes an antibiotic dose challenge or allergy consult. The primary outcome will be the percent of patients that are able to tolerate beta-lactams post-implementation of the above note template. Secondary outcomes will include the number and type of infections in which alternatives to beta-lactams are used due to a documented allergy, number and type of antibiotics used as alternatives to beta-lactams due to a documented allergy, and any adverse reaction and serious adverse reactions from dose challenges. **Results and Conclusions:** Project is currently in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference in 2017.

Learning Objectives:

Describe the different types of hypersensitivity reactions.
Indicate when a beta-lactam dose challenge would be preferred in a penicillin-allergic patient with an infection.

Self Assessment Questions:

Which of the following is true regarding IgE-mediated (type I) hypersensitivity reactions?

- A: Type I reactions are the only type of hypersensitivity reactions to c
- B: Manifestations of type I reactions include Stevens-Johnson Syndrome
- C: Based on penicillin skin testing, less than 20% of documented per
- D: Vancomycin is one of the most common causes of type I reactions

In which situation would an antimicrobial dose challenge of a beta-lactam most likely be indicated?

- A: Patient with a MRSA skin and soft tissue infection with a reported
- B: Patient with Streptococcus gallolyticus (previously bovis) endocarditis
- C: Patient with Lyme disease (only symptom is a bulls-eye rash) and
- D: Patient with a syphilis infection and a reported history of hives and

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-399L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DEVELOPMENT AND IMPLEMENTATION OF AN AUTOMATED METHOD FOR THE DETECTION OF DRUG-RELATED ACUTE KIDNEY INJURY IN HOSPITAL INPATIENTS

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Background/Purpose: Adverse drug events (ADEs) are commonly defined as any type of injury resulting from a medical intervention related to a drug. Aggregation of ADEs is often limited by reporting methodology; automated algorithms for the detection of ADEs have been previously developed and implemented by various parties with the intent of bolstering ADE capture rate. An ADE scenario of particular interest is iatrogenic acute kidney injury (AKI) related to the administration of agents with nephrotoxic potential. The purpose of this study is to develop and implement a highly predictive rules-based automated methodology for identifying instances of drug-related AKI in general hospital inpatients. **Methods:** This retrospective study involves comparing the output of iteratively developed AKI identification rules to voluntarily reported incidents of AKI during an identical time period. Incidents of AKI will be identified using the Kidney Disease: Improving Clinical Outcomes 2012 definitions. Rules will be developed using common discrete data elements identified via manual review of historical voluntary event reporting data during the period of January 1, 2011 to June 30, 2016. Iterative refinement and characterization of the output of the rules will be performed via an independent two party assessment of the presence of drug-related AKI in rule identified patients admitted to The Ohio State University Wexner Medical Center between July 1, 2016 and December 1, 2016. **Results/Conclusions:** Rule development and data collection is currently ongoing. The results of this study may assist in accurately defining the incidence of drug-related AKI in hospital inpatients without reliance on manual reporting data. Rules developed during the study may have portability to other institutions using an identical electronic health record vendor and may assist in better identifying instances of in-hospital AKI for the purposes of analysis, practice improvement, and prevention.

Learning Objectives:

Recall the methodologies that exist for identifying adverse drug events in hospital inpatients.

Describe the risks and challenges associated with automated detection of adverse drug events using discrete data contained within the electronic medical record.

Self Assessment Questions:

Which of the following estimates best represents the proportion of actual adverse drug events identified by a traditional voluntary event reporting system?

- A: Greater than 60%
- B: Less than 60% but greater than 35%
- C: Less than 35% but greater than 10%
- D: Less than 10%

Which of the following measures is not included in the Kidney Disease: Improving Clinical Outcomes definition of acute kidney injury?

- A: Increase in SCr by ≥ 0.3 mg/dl within 48 hours
- B: Increase in SCr to ≥ 1.5 times baseline within 7 days
- C: Need for initiation of renal replacement therapy
- D: Urine volume < 0.5 ml/kg/hr for 6 hours

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-963L05-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PHARMACIST INITIATED INTERVENTION IN SEPSIS MANAGEMENT IN THE EMERGENCY DEPARTMENT

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Purpose: The purpose of this research project is to improve patient care compliance with the sepsis bundle, and quality measures set forth by Center for Medicare and Medicaid Services by implementing pharmacist driven early intervention in patients presenting to the emergency department (ED) with sepsis. The primary outcome is time to antibiotic administration, thus complying with the 3-hour sepsis bundle and 1-hour septic shock recommendations. Secondary outcomes include overall sepsis bundle compliance, fluid resuscitation, and empiric antibiotics. **Methods:** The pharmacists will identify patients to initiate intervention by evaluating each patient's Systemic Inflammatory Response Syndrome (SIRS) criteria. If the patient has at least 2 SIRS criteria, the pharmacist will go to the bedside and assist in the initial evaluation of the patient with the nurse. If there is a high likelihood of infection or sepsis is suspected, the pharmacist will discuss the evaluation of the patient with the physician and make an antibiotic recommendation based on the patient's presentation and history. Data will be collected on all patients at least 18-years of age who are coded with unspecified septicemia on admission through the emergency department. Patients will be placed into two groups. Group one will be patients that received ED pharmacist interventions and group two will be the control group of patients who presented when the ED pharmacist was not present due to variable staffing hours. Data will be collected through both retrospective chart review and in real time by the ED pharmacists during the initial intervention. The antibiotics recommended by the ED pharmacist will be assessed to determine the appropriateness based on the presenting source of infection and will be evaluated for appropriate coverage once culture results are available. **Results/Conclusion:** Data collection is currently in progress. Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review sepsis bundle guidelines

Recognize the effects of pharmacist intervention with sepsis management in the emergency department

Self Assessment Questions:

Which of the following is recommended in the 3-hour sepsis bundle?

- A: Obtain blood cultures after antibiotic administration
- B: Administer broad spectrum antibiotics
- C: Administer 10mL/kg crystalloid for hypotension or lactate ≥ 4 mmol/L
- D: Measure a LDL level

In which way can pharmacists impact sepsis patient care in the emergency department?

- A: Wait to be consulted for antibiotic selection
- B: Stay in the central pharmacy until an alert is called overhead
- C: Initiate intervention with a potentially septic patient and determine
- D: Wait for the physician to see the patient

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-504L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

THE IMPACT OF ANTITHROMBIN III INFUSIONS ON THE INCIDENCE OF THROMBOEMBOLIC COMPLICATIONS IN ADULT PATIENTS UNDERGOING ASPARAGINASE-BASED CHEMOTHERAPY

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Purpose: Survival rates for adult patients with Acute Lymphoblastic Leukemia (ALL) are considerably lower compared to their pediatric counterparts. The age of diagnosis impacts patients' prognoses significantly. The outcome disparity can be largely attributed to the difference in treatment regimens used. Pediatric ALL treatment regimens typically include the administration of L-asparaginase. Despite improved outcomes, Asparaginase has been historically avoided in the adult population due to its severe toxicity profile, including increased rates of venous thromboembolic events (VTE). In an effort to reduce VTE rates in this high-risk population and minimize the morbidity and cost associated with each event, Froedtert & the Medical College of Wisconsin implemented a practice of Antithrombin III (AT) level monitoring with laboratory-guided prophylactic AT supplementation. Currently, the impact that AT level monitoring and supplementation have on VTE rates in this patient population at the institution is unknown. The purpose of comparing VTE rates in patients before and after the routine implementation of AT level monitoring is to provide clarification of AT usage and determine if a benefit exists from the additional cost of AT.

Methods: This is a single-center, retrospective, observational evaluation of AT supplementation guided by AT level monitoring. VTE rates will be compared before and after intervention from January 1st 2010 to June 30th 2016. The results will assist in the development of an institutional guideline for AT monitoring and supplementation. Preliminary results and conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the proposed benefits of Antithrombin III supplementation in patients receiving Asparaginase-based chemotherapy.

Explain the approach used at Froedtert & the Medical College of Wisconsin for Antithrombin III supplementation in patients receiving Asparaginase-based chemotherapy.

Self Assessment Questions:

Which of the following is a proposed benefit of supplementation with Antithrombin III in patients receiving Asparaginase-based

- A: Reduced thromboembolic complications
- B: Reduced myelosuppression
- C: Increased blood level concentrations of Asparaginase
- D: Reduced bleeding risks

Which of the following laboratory values is used to guide supplementation of Antithrombin III?

- A: D-dimer value
- B: Antithrombin III activity level
- C: International Normalized Ratio (INR)
- D: Albumin

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-625L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

COMPARISON OF AN ELECTRONIC HEALTH RECORD-GENERATED ANTIBIOGRAM TO A MICROBIOLOGY LABORATORY-GENERATED ANTIBIOGRAM

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Background: An important role of a hospital microbiology laboratory is the development of antibiograms. An antibiogram consists of summaries of antimicrobial susceptibilities patterns within the institution over a given time frame. Antibiograms are updated annually and contain data from the previous calendar year. Antibiograms play a crucial role in antibiotic stewardship as they assist clinicians in selecting appropriate empiric antibiotic regimens, evaluate local susceptibility patterns, and track developing resistance patterns over time. Currently, clinical microbiology laboratories use a guideline produced by the Clinical and Laboratory Standards Institute (CLSI) to develop their antibiograms. These guidelines provide recommendations on isolate selection for inclusion in the antibiogram as well as presentation and data validation. Recently, electronic health records (EHR) have developed the ability to generate a real-time antibiogram. This tool could allow the antibiogram to be created more efficiently and without human error. The primary objective of this evaluation is to compare the EHR-generated antibiogram to the microbiology laboratory generated antibiogram with manual verification and determine its appropriateness for use in clinical practice. **Methods:** The CLSI antibiogram guidelines will be reviewed to understand the standards for developing an antibiogram. The EHR-generated antibiogram will be compared to these guidelines to determine if the CLSI standards can be met. A line by line comparison of the two antibiograms will be performed by a stakeholder group to identify discrepancies. Based on this analysis, recommendations on the use of the EHR-generated antibiogram will be made. **Results/Conclusions:** In progress, will be presented at Great Lakes Pharmacy Resident Conference

Learning Objectives:

Review the Clinical and Laboratory Standards Institute guidelines for the development of an institutional antibiogram.

Recall the potential benefits of utilizing an electronic health record-generated antibiogram.

Self Assessment Questions:

What is the minimum number of isolates that a species should have to be included in an antibiogram?

- A: 10
- B: 15
- C: 30
- D: 50

Which of the following is a benefit of utilizing an electronic health record-generated antibiogram?

- A: It is more efficient
- B: It saves money
- C: It is more accurate
- D: It is easier to use

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-806L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EFFECT OF PHARMACIST-LED PATIENT MEDICATION EDUCATION GROUP ON PATIENT ATTITUDES AND KNOWLEDGE IN AN ACUTE PSYCHIATRIC INPATIENT UNIT.

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Background: Patients with psychiatric disorders have a medication adherence rate of roughly 50%. One of the most heavily researched risk factors of non-adherence is insight into illness. Researchers hypothesized that if insight into illness and treatment were increased then adherence to medication would improve. A recent meta-analysis failed to show a correlation between psychoeducation alone and medication adherence (Lincoln et al., 2007). Because insight is also related to depression, hopelessness, lower self-esteem, etc., researchers looked for other variables mediating insight and adherence (Beck et al., 2011). Focus has shifted towards attitudes towards medication. Attitudes towards medication are associated with insight but lack the demoralization component (Beck et al., 2011). The purpose of this prospective pre-post study is to determine if pharmacist-led medication education group improves patients knowledge and attitude regarding psychotropic medication. **Methods:** Northwestern Medicine Stone Institute of Psychiatry is a 29-bed inpatient unit. Group education is a cornerstone of therapy. Pharmacists lead an hour long medication education session for the higher functioning patients (without active psychotic features) once a week. The session covers how medications work, important adverse effects to be aware of, and the importance of adherence. A prospective pre-post questionnaire assessing attitude and knowledge towards medication was administered to patients attending the session between October 2016 and February 2017. Participation was voluntary and not required to attend the session. The primary endpoint of this study is the change in patient attitude and knowledge after attending the group education session. This study was approved by the Institutional Review Board at Northwestern Memorial Hospital. **Results/Conclusion:** Findings of this prospective pre-post study will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review the evidence surrounding attitudes towards medication and influence on adherence
Discuss the role of pharmacist-led group education in regards to improving medication adherence

Self Assessment Questions:

The medication adherence rate for patients with psychiatric disorders is roughly ____%.

- A 5%
- B: 50%
- C: 25%
- D: 100%

One of the highest predictors of pre-hospitalization for patients with schizophrenia is

- A non-adherence
- B unemployment
- C poor hygiene
- D substance abuse

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-858L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPROVING PATIENT ACCESS TO PRESCRIBED MEDICATIONS

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Background: Over the past three years our integrated health system has worked on developing a robust bedside delivery discharge prescription service that has led to 50 percent of prescriptions being filled by a pharmacy at one of our hospital outpatient pharmacies. This service has led to improved patient satisfaction and quality. Increased satisfaction has been demonstrated in acute care patients receiving discharge prescriptions prior to leaving the hospitals. The 2017 Department of Pharmacy Services Strategic Plan includes a goal to take the Lessons Learned from this service and applies them in our clinics so that a majority of our clinic patients get their prescriptions filled by one of our clinic pharmacies. **Objective:** The objective of this project was to identify and evaluate successful tactics to increase prescription written for patients in our clinics filled by one of our clinic pharmacies. **Methods:** Through a collaborative effort between clinic and pharmacy teams, the "Plan-Do-Study-Act" rapid cycle improvement model was used to implement several prescription retention strategies. Tactics for prescription retention were cataloged and evaluated based on a standardized scoring system. The highest ranking tactics were selected for implementation as part of a pilot at two clinic locations. Each strategy was studied by tracking the change in weekly prescription retention rates by provider. Successful strategies were then identified to implement across all clinics within our health system.

Results: Collection of information is currently in progress. Final results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Identify why prescription retention in an integrated health system can improve quality of care
Recognize methods that can be implemented to improve prescription capture

Self Assessment Questions:

Which of the following demonstrate how prescription retention from can improve clinics is better for patient care?

- A Better patient experience
- B: Improved patient access to medications
- C: Improved continuity of care
- D: All of the above

Which of the following are methods that can be implemented to improve prescription capture?

- A Use of collaborative practice agreements
- B Setting standard expectations for frontline caregivers
- C Developing unique and convenient resources for patients
- D All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-724L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ENHANCING THE CLINICAL PHARMACISTS ABILITY TO MANAGE PATIENTS ENROLLED IN A CLINICAL TRIAL

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Purpose: Clinical trials present unique challenges in the hospital pharmacists ability to appropriately manage patient care. Examples of issues that might impede care include limited knowledge of current processes to dispense study medications, interactions between study medication and current prescription regimen, or the inability to access a signed Informed Consent form. While Froedtert Hospital utilizes an Investigational Drug Service (IDS) to train its pharmacists on relevant institutional policies and procedures of clinical trials, the IDS often receives after-hours communications from pharmacists inquiring about the proper management of patients enrolled in clinical trials. Review of this data and assessment of drug error reports has revealed that Froedtert Hospital pharmacists have varying levels of knowledge while caring for patients enrolled in these clinical trials necessitating the need for further education and the development of an IDS competency.

Methods: An action research study was performed. Pharmacists were surveyed to assess baseline understanding of clinical trial process and resources made available to assist with patient care during clinical trials. Pharmacists responded via a 4-Point Likert Scale from which a pilot competency was developed. Pharmacists will complete this pilot competency and submit a post-competency survey. Analysis of this data will yield a final competency. Additionally, the numbers of pre-competency after-hours communications and severity of clinical trial medication errors are being recorded. **Summary of Preliminary Results:** Fifty six pharmacists responded to the pre-competency survey. A sample of pharmacists (n=35) will complete the pilot competency and post-competency survey. A paired t-test will be used to analyze the pre and post competency survey data and test for statistical significance. **Conclusion:** Providing Froedtert Hospital pharmacists an IDS competency should enhance their ability to care for patients enrolled in clinical trials. This result may help to minimize the severity of medication errors during clinical trials and decrease after-hours IDS communications.

Learning Objectives:

Identify key reasons for the development of an Investigational Drug Service Competency.

Discuss the benefits of providing staff pharmacists with an Investigational Drug Competency

Self Assessment Questions:

The Investigational Drug Service Competency was developed for which of the following reasons?

- A: Minimize the frequency of after-hours communications to the IDS
- B: Improve the pharmacist's ability to appropriately dispense medication
- C: Clearly define floor pharmacist's role when providing study medication
- D: All of the above

After successful completion of the IDS competency, the staff pharmacist will be able to perform which of the following tasks?

- A: Access the Drug Study Database and effectively navigate its content
- B: Locate an electronically signed Informed Consent form
- C: Enroll patients in a clinical trial when staffing in the Center for Advanced Therapeutics
- D: Answers A & B

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-927L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

CHANGES IN PROVIDER PRESCRIBING PRACTICES FOR INTRAVENOUS ACETAMINOPHEN IN PEDIATRIC PATIENTS

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Purpose: Usage of intravenous acetaminophen is restricted at our institution due to the high cost relative to oral and rectal formulations. Preliminary data indicated that our pediatric intravenous acetaminophen use has been increasing. The primary objective of this study is to determine if this increase is due to usage that falls outside the hospital's criteria for use guidelines. The secondary objective is to determine if intravenous acetaminophen is consistently being administered outside of guidelines in certain patient populations or disease states and whether revisions to the existing criteria for use guidelines are needed.

Methods: This study is a single-center, retrospective analysis of intravenous acetaminophen use at our pediatric hospital and has been approved by the Institutional Review Board. The electronic medical record was used to identify all patients less than 18 years of age who received intravenous acetaminophen between June 1st 2015 to August 31st 2015 or June 1st 2016 to August 31st 2016. Patients greater than 18 years of age and patients in the neonatal intensive care unit receiving intravenous acetaminophen for patent ductus arteriosus were excluded. Patient data collected included: patient age and weight, acetaminophen dosage, number of doses given, indication for use (diagnosis/procedure), absolute neutrophil count (ANC), diet order at time of administration, admission diagnosis, and the authorizing user for the order. Each administration was assessed to determine if it met the hospital's criteria for use guidelines. The total number of administrations that fall outside of the criteria for use guidelines will be compared between the 3 month periods to assess for trends in prescribing practices. Descriptive statistics will be utilized, as well as additional statistical analyses to determine if there has been a significant increase in inappropriate use. **Results/Conclusion:** Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize the current FDA approved indications for use for intravenous acetaminophen

Discuss the differences in pharmacokinetics between intravenous, oral, and rectal acetaminophen

Self Assessment Questions:

Which of the following is a FDA approved indication for use of intravenous acetaminophen?

- A: Management of mild to moderate pain in patients older than 2 years
- B: Management of moderate to severe pain in patients less than 2 years
- C: Management of moderate to severe pain without the use of adjunctive analgesics
- D: Reduction of fever in patients less than 2 years of age

Mean plasma concentrations of acetaminophen are _____ 30 minutes after administration of intravenous acetaminophen, when compared to the oral and rectal formulations

- A: Equivalent
- B: Higher
- C: Lower
- D: Undetectable

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-312L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ADVANCE PREPARATION (AP) OF ONCOLOGY INFUSIONS IN OUTPATIENT CLINICS

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Increased demands for cancer-related healthcare resources pressure health systems to control costs, eliminate waste, and provide care efficiently. The overarching goal of health systems is to ensure good clinical outcomes while maintaining a high level of patient satisfaction.

Due to these pressures, the administration of oncology infusions has increasingly shifted from inpatient settings to outpatient infusion clinics. The coordination of infusion visits can be complex leading to patients experiencing lengthy times in clinic. Pharmacy processes may contribute to extended length of time spent in clinic if oncology infusions are not prepared until the patient has been fully assessed on the day of the infusion visit. Increased wait time can contribute to reduced patient satisfaction with their care and reduce capacity to schedule patients. To reduce the total pharmacy processing time, The Ohio State University Wexner Medical Center implemented a process to prepare outpatient oncology infusions in advance of patient visits to improve the time to administration of these infusions. The advance preparation study will be a retrospective review comparing the time from pharmacist verification to administration of eligible infusions pre- and post-AP implementation. Oncology infusions will be eligible if the products meet these criteria: average cost < \$500, beyond use date \geq 24 hours, drug not experiencing supply issues, and a day-of-infusion dose adjustment percentage < 15%. The primary outcome is the time from pharmacist verification in the electronic health record (EHR) to the time of administration of the infusion measured using time stamps in the EHR. The secondary outcome is the wastage rate associated with implementing the new process. The cost associated with wastage along with reasons for wastage will be analyzed. Results are pending the completion and analysis of the AP of oncology infusions process improvement project.

Learning Objectives:

Discuss the role pharmacy plays in contributing to lengthy wait times for patients in outpatient oncology infusion clinics

Identify criteria that make medications ideal candidates for advance preparation of chemotherapy in outpatient oncology infusion clinics

Self Assessment Questions:

Which of the following is a potential pharmacy contributor to increased patient wait times during outpatient oncology infusion visits?

- A: Infusion compounding
- B: Infusion administration
- C: Patient scheduling
- D: Drawing laboratory tests

Which of the following was a criteria used to identify eligible oncology infusions for advance preparation?

- A: Cost greater than \$500.00
- B: Stability greater than or equal to 24 hours
- C: Experiencing critical shortage issues
- D: Volume greater than 1000 milliliters

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-906L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

CEFTRIAXONE VERSUS ANTIPSEUDOMONAL BETA LACTAMS FOR THE TREATMENT OF COMMON AMPC PRODUCING ORGANISMS

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Purpose: Resistance to antibiotic therapy complicates AmpC beta-lactamase-producing organism treatment. Enterobacteriaceae species repress AmpC beta-lactamase enzyme production at baseline, but can increase production 10- to 100-fold after being exposed to specific beta-lactam antibiotics. Induction of antibiotic resistance is associated with increased morbidity and mortality. Ceftriaxone, a third generation cephalosporin, is controversial in the treatment of AmpC-producing organisms due to the risk of inducible resistance. This study seeks to compare rates of treatment failure between ceftriaxone and antipseudomonal beta-lactam antibiotics for the treatment of AmpC-producing organisms. Methods: This retrospective, multi-center study evaluated patients who received either ceftriaxone or an antipseudomonal beta-lactam single agent for definitive therapy for Enterobacter, Citrobacter, or Serratia species infections. Definitive therapy was defined as the antibiotic that was received five days after culture collection. Treatment failure was defined as either clinical failure (e.g., abnormal leukocyte count; temperature on day seven post-antibiotics) or microbiologic failure (i.e., regrowth of the same organism at the same site of infection within 14 days of the original culture). Patients were excluded if a secondary infection occurred in the clinical failure evaluation window. The primary objective compared treatment failure rate between ceftriaxone and antipseudomonal beta-lactam antibiotics when treating common AmpC-producing organisms. Secondary objectives included comparison of resistant reinfection incidence; subgroup analysis comparison between classes of antipseudomonal beta-lactams; and logistic regression analyses to assess factors associated with and independent risk factors for treatment failure. A priori covariates identified included SOFA score, beta-lactam use within the last 14 days, level of care, species of infective organism, and site of infection. Data analysis is currently ongoing. Results: Results to be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the challenges associated with treating common ampC beta-lactamase producing organisms

Identify appropriate antibiotic coverage for common ampC beta-lactamase producing organisms

Self Assessment Questions:

Which of the following beta-lactam antibiotics is the most stable against the AmpC beta-lactamase enzyme?

- A: Cefazolin
- B: Piperacillin/Tazobactam
- C: Ceftriaxone
- D: Cefepime

Inducible activity of a beta-lactamase enzyme is most accurately defined as:

- A: Bacterial species maintain high levels of beta-lactamase enzymes
- B: The presence of an antibiotic influences increased transcription of
- C: The presence of an antibiotic activates the beta-lactamase enzyme
- D: Bacterial species will not generate the beta-lactamase enzyme until

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-302L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DIGOXIN DOSING IN PATIENTS UNDERGOING CONTINUOUS RENAL REPLACEMENT THERAPY

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Purpose: Current guidelines recommend digoxin for patients with atrial fibrillation. In critically ill patients, it is frequently used for atrial fibrillation with rapid ventricular response and hemodynamic instability secondary to digoxins limited effect on the hemodynamic profile. Optimal dosing regimens of digoxin therapy for patients undergoing continuous renal replacement therapy (CRRT) are not well defined in current literature, with only a single case report to date describing a single patient sieving coefficient. Current dosing references recommend digoxin 0.0625mg every 48 hours while on CRRT, with no specifications stratified by flow rates. The purpose of this study is to report our centers experience with patients receiving digoxin therapy while on continuous renal replacement therapy. **Methods:** This study is a retrospective review of patients greater than or equal to 18 years of age admitted to IU Health Methodist Hospital from June 1, 2011 to May 31, 2016, who received digoxin while also undergoing continuous renal replacement therapy. This study was approved by the IRB with waiver of informed consent. Patients will be excluded if they were pregnant or did not have a serum digoxin concentration while on CRRT. Data collected will include age, gender, body habitus, baseline renal function, all doses of digoxin given during CRRT, CRRT dosing parameters, and digoxin serum concentrations. The primary objective assessed will be the mean dosage requirement to achieve adequate serum concentrations for continuous venovenous hemodialysis ultrafiltration rates of <1.8L/hr and >1.8L/hr. Secondary objectives assessed include frequency of supra therapeutic concentrations (>2ng/mL) and need for digoxin monoclonal antibody rescue therapy. Continuous variables will be assessed utilizing Students T Test, while categorical data will be assessed utilizing a Chi Squared or Fishers Exact test as appropriate. Data collection and analysis is ongoing, final results will be presented.

Learning Objectives:

Outline current dosing recommendations for digoxin in patients undergoing continuous renal replacement therapy.

Discuss characteristics of drug molecules that promote removal during continuous renal replacement therapy.

Self Assessment Questions:

Which of the following doses of digoxin is commonly recommended in continuous venovenous hemofiltration:

- A: 62.5mcg every 24 hours
- B: 62.5mcg every 48 hours
- C: 125mcg every 24 hours
- D: 250mcg every 48 hours

Which of the following is a drug molecule characteristic that would promote removal during continuous venovenous hemofiltration?

- A: High molecular weight (>15000 daltons)
- B: Large volume of distribution (>3L/kg)
- C: Low protein binding
- D: Low lipid solubility

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-606L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PERSISTENCE IN ADDICTION RECOVERY: PHARMACIST ROLE IN TRANSITION OF CARE TO OUTPATIENT REHAB (PAR-PHOUR)

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Background: The transition of care for patients with opioid use disorder who are seeking treatment after inpatient detoxification is crucial and requires significant planning and interdisciplinary involvement. Pharmacist-led discharge education has shown to be effective in other chronic disease states. To date, no studies have been done to assess this pharmacist-driven intervention in patients with opioid use disorder. **Study objective:** To determine whether pharmacist involvement in the discharge process for patients with a primary diagnosis of opioid use disorder increases the persistence through treatment for substance use. **Methods:** The study objective will be met by identifying a cohort of patients who have a diagnosis of opioid use disorder and are discharging from the Integrated Recovery unit at Community Health Network (CHNw) and will be receiving outpatient rehab at Gallahue Mental Health Services (contracted affiliate of CHNw). These patients will receive discharge education provided by a pharmacist. All eligible patients must receive a discharge prescription for either buprenorphine/naloxone or long-acting injectable (LAI) naltrexone. At 30- and 90-day follow-up, the patient will be contacted for a structured phone interview to report attendance at follow-up appointments, adherence, occurrence of relapse (via self-report), and use of counseling. Additionally, a chart review will be conducted at these follow-up dates to assess for attendance at outpatient appointments, positive urine drug screens, and readmissions. A historical control group will be generated to compare with the prospective cohort via chart review. The primary endpoint of persistence in addiction treatment will be evaluated as a composite of compliance with the discharge medication and 30- and 90-day follow-up information. Subgroup analyses for all variables will be conducted for the LAI naltrexone and buprenorphine/naloxone groups. **Results:** The results of this study may lead to a continued implementation of pharmacist-led discharge education providing improved transitions of care for patients with opioid use disorder.

Learning Objectives:

Identify barriers to transitions of care for patients with opioid-use disorder.

Review a pharmacist-delivered service and its impact of opioid-use disorder transitions of care.

Self Assessment Questions:

Pharmacists have a well-established role in transitions of care for patients in the following settings, except:

- A: Asthma and COPD
- B: Heart failure
- C: Opioid use disorder
- D: Stroke/MI

Nearly ____% of 7-day readmissions are directly due to substance-use disorders.

- A: 7
- B: 10
- C: 15
- D: 23

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-576L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

MEASURING THE IMPACT OF QUALITY IMPROVEMENT METHODOLOGIES TO REDUCE WHITE BAGGING INEFFICIENCIES IN A PEDIATRIC GASTROENTEROLOGY INFUSION CLINIC.

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Purpose: "White bagging" is the process by which an outside pharmacy ships medication on behalf of a patient to an infusion pharmacy for administration. The process is sometimes used by payers as a cost-containment strategy, though it carries significant operational, regulatory, safety, and fiscal implications for health-system pharmacies. It can cause delays in therapy and require significant patient engagement in the drug procurement process. A baseline study from January 1, 2016 through September 30, 2016 analyzed this process and identified \$59,048 of infliximab drug waste. The purpose of this study is to apply quality improvement methodologies to the white bagging process for gastroenterology (GI) infusion clinic patients receiving infliximab and determine whether a QI approach has an impact on changing identified process behavior. **Methods:** A Key Driver Diagram was developed to serve as the roadmap for the project. The primary study outcome measure is a reduction in the white bagging inefficiency rate in GI infusion clinic patients receiving infliximab from 85% to 60% by 4/1/17, sustained through 8/1/17. Baseline data analysis was completed through retrospective chart review. The collected data included infliximab dose, quantity sent, arrival date, infusion date, waste and categorization of waste. Three key drivers were identified through the use of Pareto charts and process maps, which included an operationally efficient white bagging process, the relationship with specialty pharmacies, and nursing integration. Interventions to improve key drivers included dose rounding of infliximab, white bagging partnerships with specialty pharmacies, and nursing integration in white bagging education. Each intervention will follow a Plan-Do-Study-Act format. Data will be analyzed monthly by calculating a white bagging inefficiency rate, which is the sum of complete and accurate white bagging occurrences divided by total white bagging occurrences. **Results/Conclusion:** To be presented at Great Lakes Residency Conference.

Learning Objectives:

Identify causes of drug waste in the white bagging process.
Explain the healthcare economics that have led to white bagging in health-system pharmacies.

Self Assessment Questions:

Which of the following is NOT a cause of white bagging drug waste?
A Partial vial drug waste that is discarded from a patient-specific dose
B: B. Drug that is sent from a specialty pharmacy to a health-system
C: Drug that arrives on time and is administered as a full vial.
D: Drug that is sent from a specialty pharmacy to a health-system pharmacy

Which of the following best explains why some payers are pushing patients to receive specialty medications through white bagging?
A Health-system pharmacies are unable to provide high-cost specialty
B White bagging provides payers with a cost-containment strategy
C Select patients experience out-of-pocket savings that incentivize them
D Both B. and C.

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-410L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EFFECTIVENESS OF A WRITTEN CONTINUING EDUCATION MODULE FOR SPECIALTY PHARMACISTS: A PROSPECTIVE PATIENT BENEFIT ANALYSIS

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Purpose: Continuing education (CE) is an important facet of pharmacy practice that has demonstrated improvement in knowledge of pharmacy professionals. However, few studies demonstrate how an increase in pharmacist competency translates into enhanced patient knowledge and improved outcomes. The objective of this study is to determine the effectiveness of the CE activity created by Pharmacy Times Continuing Education titled "Pharmacists Reaching Out(R): The Pharmacist Role in Management of Psoriasis and Psoriatic Arthritis" in improving patient knowledge of their disease state and therapy through increased pharmacist competence. **Methods:** This prospective, patient benefit analysis consisted of two patient cohorts and one pharmacist cohort. The first patient cohort consisted of patients with either psoriasis or psoriatic arthritis who received counseling from a specialty pharmacist during a three-month period prior to the study's start date. This cohort was offered a survey that aimed to assess the patients' knowledge of their therapy and disease state. Next, patient-facing specialty pharmacists were educated using an Accreditation Council for Pharmacy Education (ACPE) certified CE module on psoriasis and psoriatic arthritis during the month of October 2016. The second patient cohort consisted of patients similar to the first patient cohort, except that they received counseling from a specialty pharmacist who completed the CE module. This cohort received the same survey as the first patient cohort. The primary efficacy outcome of this study is the comparison of correct patient answers from both patient cohorts. Secondary outcomes of this study included: analysis of pharmacist scores on the CE pre-test, post-test and 30-day follow-up post-test, review of participation for both pharmacists and patients via module completion and survey response rate, and examination of patient thoughts on adherence to their medication regimen pre- and post-counseling. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the importance of pharmacist continuing education (CE) in the specialty pharmacy setting.
List the important counseling points that are necessary to communicate to patients on biologic therapy for psoriasis or psoriatic arthritis

Self Assessment Questions:

What is one of the reasons that effective specialty-related Continuing Education (CE) is important for specialty pharmacists?
A Certified Specialty Pharmacist (CSP) certification requires specialty
B: Specialty pharmacists are required to obtain specialty-related CE
C: Specialty pharmacists can be allowed biologic prescribing rights without
D: Specialty pharmacists are never required to counsel patients on biologics

Which of the following is an important counseling point to communicate to a patient taking a biologic medication for plaque psoriasis or psoriatic arthritis?

- A Mild injection site reactions are not common and are a cause for concern
- B Treatment efficacy is not usually immediate, and may take up to 12 weeks
- C Anti-TNF biologic products work by improving the patient's innate immune response
- D Warming a biologic agent by placing it under running hot water can improve efficacy

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-870L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION OF MULTI-DISCIPLINARY POLICIES AND PROCEDURES FOR DOCUMENTATION OF PATIENTS WITH AMBULATORY INFUSION PUMPS TO FACILITATE CONTINUITY OF CARE

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Ambulatory infusion pumps, implanted or external, are used to deliver a continuous supply of medication in the home setting, outside of a hospital or an infusion center. The classes of medications administered through infusion pumps have expanded to treat a variety of disease states including diabetes, chronic pain, muscle spasticity, and pulmonary hypertension. Inconsistencies in current practices for documentation of the infusion pumps within electronic health record (EHR) pose safety risks including therapy duplication, possible drug-drug interactions, or lack of awareness of pump presence. To enhance patient safety and continuity of care, a comprehensive procedure was developed to document ambulatory infusion pumps, especially medication being infused, within EHR. This is a quality improvement project and is therefore exempt from review by the Institutional Review Board. A taskforce consisting of inpatient pharmacists, pharmacy resident, physician specialists, and information technology analyst was assembled to develop and implement a streamlined workflow for documentation of ambulatory infusion pumps. Literature review and background research were conducted to gain insight into any existing best practice standards and current practices at other institutions. The taskforce met with internal specialty subject matter experts to review existing practices and regulations. A workflow and informatics build were developed to aid documentation of ambulatory infusion pumps from the point of admission to inpatient care and discharge. This workflow and updated policies were proposed to a multidisciplinary panel of stakeholders. Education modules were developed to inform front-line users of the workflow prior to rolling out. Results and conclusions of this project will be presented at the Great Lakes Pharmacy Residency Conference. Post-implementation audit will be performed to ensure compliance.

Learning Objectives:

Recognize the potential patient safety issues related to ambulatory infusion pumps during a hospitalization

Describe the methods that can be employed to ensure safety for patients with ambulatory infusion pumps and continuity of care

Self Assessment Questions:

Which of the following is a potential safety issue related to ambulatory infusion pumps that can be prevented with proper documentation?

- A Pump malfunction
- B: Patient's inability to self-manage infusion pump
- C: Drug-drug interactions
- D: Entry site infections

Which of the followings are methods that can be employed to ensure safety for patients with ambulatory infusion pumps and continuity of care?

- A Transparent documentation of medication being infused via pump;
- B Rely on nursing staff to hand off information regarding ambulatory
- C Document ambulatory infusion pumps within progress notes
- D It is the patient's responsibility to self-report ambulatory infusion pump

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-728L05-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PHENOBARBITAL COMPARED TO USUAL CARE FOR THE TREATMENT OF SEVERE ALCOHOL WITHDRAWAL SYNDROME

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Background/Purpose: Alcohol withdrawal syndrome (AWS) is a frequent complication in hospitalized patients. First-line treatment is primarily symptom-triggered benzodiazepine (BZD) therapy guided by the revised Clinical Institute Withdrawal Assessment for Alcohol (CIWA-Ar) score. Despite overall success with the use of symptom-triggered BZD therapy up to one-half of patients require adjunct or alternative therapy. Studies evaluating alternative pharmacotherapy for severe AWS are scarce. Phenobarbital (PHB) offers a dual mechanism of action for AWS but has limited data evaluating efficacy and safety in this population. The primary objective of this study is to compare intensive care unit (ICU) length of stay (LOS) between patients who either received a PHB treatment protocol or usual care with a BZD-based treatment protocol for severe AWS. Secondary outcomes include total PHB and BZD doses, use of adjunct or continuous sedation, incidence of delirium, daily peak Richmond Agitation and Sedation Scale (RASS) scores and CIWA-Ar scores for the first 7 days of treatment. Duration of mechanical ventilation, hospital and progressive care unit (PCU) LOS, and in-hospital mortality will also be compared. **Methods:** This is a single-center, retrospective cohort study performed at a large, academic medical center and community teaching hospital. Patients with CIWA-Ar scores ≥ 20 treated with either PHB or a BZD requiring admission to the surgical ICU, medical ICU, or PCU between October 1, 2011 and September 30, 2016 will be screened. Baseline characteristics include APACHE II score, history of AWS, reported alcohol use, active seizures, peak CIWA-Ar score, psychiatric illnesses, pertinent chronic medications, liver function tests, and blood alcohol level on admission.

Results/Conclusions: The results of this study will provide clinicians with further insight into the efficacy and potential benefits of PHB use in patients with severe AWS. The final results will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify limitations with the use of benzodiazepine therapy for the treatment of severe alcohol withdrawal syndrome.

Discuss existing literature evaluating the use of phenobarbital for the treatment of alcohol withdrawal syndrome and opportunities for further research.

Self Assessment Questions:

Which of the following receptor and receptor activity pairs may increase clinical efficacy with the use of phenobarbital as compared to benzodiazepines for alcohol withdrawal syndrome?

- A γ -aminobutyric acid (GABA), inhibition
- B: N-methyl-D-aspartate (NMDA), inhibition
- C: γ -aminobutyric acid (GABA), agonist
- D: N-methyl-D-aspartate (NMDA), agonist

Limitations with data surrounding the use of phenobarbital in the alcohol withdrawal patient include which of the following?

- A Lack of generalizability
- B Risk of unmeasured confounding variables
- C Lack of reporting of phenobarbital dosing strategies
- D All of the above

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-359L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION OF PHARMACY SERVICES TARGETING TRANSITIONS OF CARE AND DRUG OPTIMIZATION IN PATIENTS WITH HEART FAILURE

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Purpose: To establish a pilot program focused on patients with heart failure incorporating pharmacists into medication education and medication reconciliation prior to patient discharge. **Methods:** This is a single-center, quality improvement pilot project including all adult patients with systolic heart failure admitted to a general cardiology unit during the month of February 2017. The process will include two components: patient education and discharge medication review by a pharmacy resident. Patients will be encouraged to attend a heart failure medication education session once prior to discharge, which will be provided every Monday, Wednesday, and Friday for 30 minutes. The pharmacy resident will perform group-based education, using a standardized focused on medications used to treat heart failure. Medication review will occur prior to patient discharge to identify (1) discrepancies between admission and discharge medication reconciliation, (2) consistency with heart failure medication regimen to guideline-directed medical therapy, (3) opportunities for optimizing heart failure regimens to target doses, (4) and total pharmacist time devoted to medication reconciliation and education for each patient, to be comprised of coordination, preparation, and interventions. **Results and Conclusions:** Data collection and analysis is currently in progress.

Learning Objectives:

Explain how pharmacy staff can be utilized to improve transitions of care for patients.

Describe the benefits of incorporating pharmacy into the transition of care process.

Self Assessment Questions:

Which of the following are NOT opportunities for pharmacy interventions during the transitioning of care for patients?

- A: Medication reconciliation
- B: Medication education
- C: Reducing medication accessibility
- D: Reducing medication errors

What has available literature shown when pharmacy services have been included in the transitions of care process for patients?

- A: Decreased patient adherence
- B: Decreased medication errors
- C: Increased re-hospitalization
- D: Increased mortality

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-562L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

HOSPITAL READMISSION RATES FOR PATIENTS TREATED WITH CEFTRIAXONE AND AZITHROMYCIN VERSUS LEVOFLOXACIN FOR COMMUNITY ACQUIRED PNEUMONIA

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Purpose: Infectious Disease Society of America/American Thoracic Society guidelines on the management of community-acquired pneumonia (CAP) recommend treatment with levofloxacin or the combination therapy ceftriaxone and azithromycin for non-intensive care unit (non-ICU) patients. There is limited data regarding mortality rates and hospital readmission rates between each treatment option. This study aims to determine if the combination therapy is superior to levofloxacin monotherapy based on thirty-day readmission rates of any cause with the intent of reducing levofloxacin resistance and ultimately reducing hospital readmission rates. **Methods:** This multi-center retrospective chart review included non-ICU patients admitted for CAP. The hospital quality metrics program, Crimson, was utilized to gather patients based on diagnosis-related groups (DRGs) for simple pneumonia while excluding patients with DRGs regarding chronic obstructive pulmonary disease. The primary outcome is thirty-day all-cause readmission rates. Secondary endpoints include: length of stay, time to readmission, total treatment length with each drug group, reason for discontinuing antibiotic, Clostridium difficile infection development, antibiotic regimen changed, duration of fever, mortality within thirty days reason for readmission, adverse effects leading to discontinuation of treatment, and outpatient treatment. Inclusion criteria were eighteen years of age or greater, CAP diagnosis, and receiving either the combination ceftriaxone and azithromycin or levofloxacin monotherapy within forty-eight hours of presentation. Exclusion criteria were ICU patients, less than eighteen years of age, pregnancy, prisoners, antibiotic treatment for five or more days in the past ninety days, intravenous antibiotics within the past ninety days, chronic obstructive pulmonary disease, immunocompromised patients, and administration of antibiotics different from the designated group within forty-eight hours of presentation. Hospital readmission rates between two treatment groups will be compared using chi-square test. **Results and Conclusions:** Results and conclusions will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss resistance considerations when comparing empiric treatment of CAP for inpatients.

Identify adverse effects of fluoroquinolones which are less prevalent in ceftriaxone and azithromycin.

Self Assessment Questions:

Which of the following organisms is the most common cause of CAP and has been associated with increased rates of fluoroquinolone resistance?

- A: Streptococcus pneumoniae
- B: Haemophilus influenza
- C: Legionella species
- D: Mycoplasma pneumoniae

Which of the following is a concerning side effect for fluoroquinolones which is not a black box warning?

- A: Tendonitis
- B: Clostridium difficile infection
- C: Peripheral neuropathy
- D: Hallucinations

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-610L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

INTEGRATING STANDARDIZED CLINIC ADMINISTERED MEDICATION PROCESSES AT A MULTI-SITE HEALTH SYSTEM

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Patient care in the United States healthcare system is increasingly moving from inpatient to ambulatory care settings. Given high patient volumes and medication use, it is important to evaluate the ambulatory care medication use system to ensure patient safety and regulatory alignment. Best practices for ambulatory care medication use systems have not been extensively described in the literature; however some studies suggest that the current medication use systems in clinics are suboptimal. At UW Health, there is an organizational need to standardize processes as a result of recent integration of over 100 separate primary and specialty care ambulatory clinics into a single entity. Purpose: The aim of this project is to develop and implement standardized medication procurement, delivery and storage workflows for in-clinic administered medications at UW Health clinics and evaluate the financial, regulatory compliance, and service satisfaction impact of implementation. Methods: A resident-led work group was developed to implement and evaluate standardized medication processes. Standardized processes and policies for in-clinic administered medications procurement, delivery, and storage were developed based on best practice literature and expert consensus. Standard clinic stock lists were created for clinics based on utilization, patient population, and clinic-specific needs. Pharmacy technician workflows were created for the oversight of delivery, storage, inventory management, and compliance monitoring. Based on projected workload needs for implementation of pharmacy technician oversight, technical workforce and resources needed to sustain the integrated processes across all clinics were obtained. Analysis of the implementation included pre- and post-implementation quantification of clinic and central supply inventory on hand cost and turns, percent compliance with policy and regulatory requirements, time studies and workload analysis of medication delivery and inventory management activities, and service satisfaction for clinic staff, pharmacy personnel, and ambulatory care leadership. Results & Conclusions: To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the benefits of implementing standardized processes
Define metrics to evaluate success of implementation of standardized processes

Self Assessment Questions:

Benefits of implementing standardized clinic administered medication processes at multi-site health-system include which of the following:

- A: Improved patient satisfaction survey scores
- B: Improved inventory management through standard stock lists
- C: Increase in on-hand inventory costs
- D: Improved patient wait times for clinic visits

Identify one metric that can be used to evaluate success of implementing standardized in-clinic administered medication processes.

- A: Thirty day re-admission rates
- B: Percent compliance with regulatory standards
- C: Average patient wait times per clinic visit
- D: Healthcare associated infection rates

Q1 Answer: B Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-782L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DESCRIBING AND QUANTIFYING INTRAVENOUS DRUG ADMINISTRATION IN THE NEONATAL ICU

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Purpose: During intravenous administration, drug delivery can be compromised by a number of factors including the IV delivery system (tubing, connectors, and needleless sites), IV fluid rate, flushes, and infusion site. Variability in drug delivery can affect therapeutic response as well as create challenges with assessing pharmacokinetic parameters. Intravenous drug delivery problems are compounded when introduced to neonates because of the small volumes used, low infusion rates, and many other factors. The FDA recently released a safety communication related to fluid flow issues with syringe pumps programed for low infusion rates. The purpose of this study is determining the variability of drug delivery between various neonatal ICL IV infusion sets and describing differences in IV infusion practice across various neonatal ICUs. Methods: Web based surveys to determine current neonatal ICU IV infusion practices were distributed through the Vermont Oxford Network. Survey results will be used to describe IV infusion configuration differences between centers and unique configurations will be used for in vitro infusion simulations. Infusion test conditions will simulate a 3 and 3.5 mg/kg gentamicin intermittent infusion for patients weighing 0.6 kg and 3 kg, respectively. Dextrose will be infused as a surrogate drug marker into a Viaflex bag along with maintenance fluids. Samples will be drawn every 15 minutes from this bag and drug marker concentrations will be quantified with the glucose oxidase method. Observed and expected percentage of drug delivered will be compared between IV sets of the same weight category to determine the amount of variability between infusion sets.

Results: Data collection is ongoing and results will be presented at GLPRC Objectives: Conclusions: Data collection is ongoing and results will be presented at GLPRC.

Learning Objectives:

Describe drug delivery related factors that impact neonatal intravenous drug delivery
Recognize methods to optimize intravenous drug delivery for neonatal IV therapy

Self Assessment Questions:

Intravenous drug delivery at low infusion rates in neonates results in which of the following?

- A: Delays in complete drug delivery and improved therapeutic drug rr
- B: Earlier than expected drug delivery and decreased therapeutic dru
- C: Delays in complete drug delivery and decreased therapeutic drug
- D: Earlier than expected drug delivery and improved therapeutic drug

Which of the following will minimize delays in intravenous drug administration in neonates?

- A: Increasing the dead space at the injection site
- B: Priming infusion pumps before administration of continuous infusio
- C: Frequently altering the maintenance fluid flow rate
- D: Connecting multiple infusions to a single line with add-on devices

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-966L05-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

COST ANALYSIS AND LENGTH OF STAY ASSOCIATED WITH LINEZOLID VERSUS VANCOMYCIN USE IN METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS PNEUMONIA IN A REGIONAL HEALTH ORGANIZATION

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Purpose: A focused study of treatments for MRSA pneumonia is warranted due to recent reductions in acquisition cost of linezolid, increasing occurrence of elevated vancomycin MICs, and IDSA pneumonia guidelines parring vancomycin and linezolid with considerations for patient-specific factors. Economic analyses to date have extrapolated findings from RCTs as opposed to real-world data with actual utility. Awareness of recent usage, clinical outcomes, and cost of treatment between the medications are valuable data that could have implications on current practice and necessitate further discussion. **Methods:** This IRB-approved retrospective cohort review has the primary goal of comparing overall cost of treatment and length of stay for patients diagnosed with pneumonia and treated with linezolid or vancomycin. Secondary outcome measures include clinical success and failure, adverse drug events, duration of antibiotic therapy, and all-cause mortality. Data from patient records and cost histories for the TriHealth health system of Cincinnati, Ohio were accessed utilizing EPIC, Premier QualityAdvisor, and Data Warehouse. Participant records from January, 2014 to December, 2016 were analyzed and compared for treatment of confirmed or presumed MRSA pneumonia. The linezolid group was identified through QualityAdvisor generated reports, and the vancomycin comparative cohort was selected through 1:1 3M risk scoring classification. Factors considered in subject balance include whether or not patients were mechanically ventilated, treated in the ICU, or diagnosed with CAP versus HAP/VAP as these factors independently contribute to costs. Several patient-specific data sets are to be analyzed including comorbidities, hospital-administered medications, method of ventilation, renal function, radiological and microbiological findings, MRSA PCR and procalcitonin results, and permanent medical record information detailing clinical outcomes. Primary and secondary endpoints are to be analyzed between groups using appropriate statistical tests. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference 2017.

Learning Objectives:

Recognize clinical circumstances in which either linezolid or vancomycin is a better clinical option for MRSA pneumonia

List factors contributing to total cost for MRSA pneumonia treatment

Self Assessment Questions:

If vancomycin and linezolid treatment for pneumonia are equally cost-effective at your institution, what would be the most acceptable argument for choosing linezolid for treating MRSA pneumonia?

- A: Vancomycin MIC ≥ 2
- B: Concomitant piperacillin-tazobactam therapy
- C: Unable to tolerate oral medication
- D: History of red man syndrome reaction

When considering total cost of treatment for pneumonia, which has the greatest contribution to higher costs?

- A: Drug acquisition costs
- B: Length of stay in hospital
- C: Nursing time
- D: Clinical pharmacist activity

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-603L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF REAL-TIME NOTIFICATION OF CLOSTRIDIUM DIFFICILE TEST RESULTS AND EARLY INITIATION OF EFFECTIVE ANTIMICROBIAL THERAPY

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Clostridium difficile is a prominent nosocomial pathogen, and is the most common causative organism of healthcare associated diarrhea. No studies have investigated the impact of real-time notification of culture results with rapid Antimicrobial Stewardship Program (ASP) intervention in the setting of *Clostridium difficile* infection (CDI). The purpose of this study is to assess the impact of real-time notification of detection of toxigenic *C. difficile* by DNA amplification results in patients with confirmed CDI. This study will be submitted to the Institutional Review Board for approval. The study will be broken into two arms: patients treated for CDI prior to implementation of the real-time notification system and patients treated for CDI post implementation of the real-time notification system. The ASP will be contacted via the Clinical Triggers listserv regarding positive toxigenic *C. difficile* results. An alert was also created in TheraDoc, an electronic surveillance system that notifies the ASP in real time when *C. difficile* is identified in the microbiology lab. Once a CDI is detected, the ASP will ensure the initiation of effective antimicrobial therapy and implementation of contact precautions. Oral vancomycin or metronidazole will be considered effective antimicrobial therapy for mild-to-moderate infections. Oral vancomycin, with or without metronidazole, will be considered effective therapy for severe or severe, complicated infections. The primary outcome will be time to initiation of effective antimicrobial therapy. Secondary outcomes will include time to order entry of therapy, time to initiation of contact precautions, all-cause mortality, overall length of stay, length of stay in the ICU, length of stay from culture collection to discharge, 30-day readmission rates, and total hospital cost per case. All data will be recorded without patient identifier and maintained confidentially. Data collection is in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Define the supportive clinical data that classifies mild-to-moderate, severe, and severe-complicated *Clostridium difficile* infection.

Identify the recommended treatment regimen for mild-to moderate, severe, and severe-complicated *Clostridium difficile* infection.

Self Assessment Questions:

Which of the following statements correctly defines a severe *Clostridium difficile* infection?

- A: Leukocytosis with a white blood cell count of $\geq 12,000$ cells/ μ L or $\geq 15,000$ cells/ μ L
- B: Leukocytosis with a white blood cell count of $\geq 15,000$ cells/ μ L or $\geq 12,000$ cells/ μ L
- C: Leukocytosis with a white blood cell count of $\geq 12,000$ cells/ μ L or $\geq 15,000$ cells/ μ L
- D: Leukocytosis with a white blood cell count of $\geq 15,000$ cells/ μ L or $\geq 12,000$ cells/ μ L

Which of the following would be a recommended treatment regimen for a severe *Clostridium difficile* infection?

- A: Metronidazole 500 mg 3 times per day by mouth for 10-14 days
- B: Vancomycin 125 mg 4 times per day by mouth for 10-14 days
- C: Vancomycin 500 mg 4 times per day by mouth, plus metronidazole
- D: Vancomycin in a tapered and or pulsed regimen

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-395L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DEVELOPMENT OF A STANDARDIZED TREATMENT ALGORITHM FOR NEONATAL ABSTINENCE SYNDROME USING CLONIDINE AS ADJUNCTIVE THERAPY

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Purpose: Although morphine sulfate has been the standard pharmacologic treatment for neonatal abstinence syndrome (NAS), there is no gold standard approach regarding the initiation and weaning of morphine. Opioids have been shown to produce negative effects on the developing neonatal brain, highlighting the importance of prompt weaning and discontinuation of opioid therapy. Previous studies show that clonidine, a centrally acting alpha2 agonist, decreases opioid requirements for NAS and may also provide additional neuroprotection. The purpose of this study is to assess whether a standardized treatment algorithm for NAS using clonidine as adjunctive therapy reduces the duration of morphine therapy. Methods: A retrospective chart review of neonates requiring pharmacologic treatment for NAS at UnityPoint Health - Meriter was conducted between December 2015 and January 2016. A standardized algorithm using clonidine as adjunctive therapy was implemented in January 2017 with the goal of reducing duration of morphine therapy. Following implementation, data will be collected from January 2017 to April 2017. Neonates with congenital anomalies or gestational age less than 35 weeks were excluded from the analysis. Data collected will include gestational age, mean Modified Finnegan Score (MFS) at start of treatment, mean total daily morphine dose, total morphine dose, duration of morphine treatment, adjunctive therapy needed, type of feedings received, and changes in blood pressure and heart rate. The primary outcome of this study is duration of morphine therapy. Secondary outcomes include length of hospitalization, total morphine dose, and differences in blood pressure and heart rate. Results/Conclusions: Data collection is ongoing and final results will be presented at the 2017 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Define the Modified Finnegan Score (MFS) and explain its use in neonatal abstinence syndrome.
Describe the benefits and limitations of current pharmacologic therapies for neonatal abstinence syndrome.

Self Assessment Questions:

Which of the following statements is true regarding the Modified Finnegan Score (MFS)?

- A It is used to determine the need for pharmacologic therapy only
- B It is an objective scoring tool used to assess neonatal withdrawal
- C It is used to evaluate neonatal symptoms every 6 hours
- D It assesses symptoms including high-pitched crying, sneezing, and

Which of the following is a potential benefit of clonidine therapy in neonatal abstinence syndrome (NAS)?

- A Decreased constipation
- B Decreased total morphine dose
- C Increased appetite
- D Decreased risk of seizures

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-481L01-P
Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

APPROPRIATENESS AND IMPROVEMENT OF PHARMACOLOGIC VENOUS THROMBOEMBOLISM PROPHYLAXIS IN MEDICALLY-ILL HOSPITALIZED VETERAN PATIENTS

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Purpose: Clement J. Zablocki Veterans Affairs Medical Center currently does not require providers to assess venous thromboembolism (VTE) risk using a risk assessment model (RAM) upon admission. The objective of this project is to assess the appropriateness of pharmacologic VTE prophylaxis prescribing and improve utilization of best-practice VTE RAMs in medically-ill hospitalized patients admitted to the medicine service through anticoagulation order set improvement. Methods: This quality assurance project utilized an electronic medical record to identify 100 random inpatient veterans admitted to the medicine service in September 2016 (control group) for an initial assessment of pharmacologic VTE prophylaxis prescribing and again in December 2016 (intervention group) following implementation of an anticoagulation order set which requires the calculation of a Padua Prediction score (PPS) > 4 (high risk) prior to allowing the physician to proceed. Appropriateness of VTE prophylaxis practices was assessed based on presence of an anticoagulation contraindication or full anticoagulation, calculated PPS, and pharmacologic thromboprophylaxis administration. Results: Appropriate pharmacologic VTE prophylaxis prescribing occurred in 85% of the control group compared to 90% of the intervention group (presented in this order hereafter). Prophylaxis was appropriately not prescribed for 100% of those with a contraindication to anticoagulation or who were fully anticoagulated in both groups. Of patients with a PPS >4, pharmacologic VTE prophylaxis was appropriately prescribed in 94.6% versus 94.4% (p=0.68) of patients. Of patients with a PPS <4, pharmacologic VTE prophylaxis was appropriately not prescribed in 56.7% versus 63.4% (p=0.42) of patients. Conclusions: A majority of patients at high risk of VTE (PPS >4) are appropriately prescribed pharmacologic VTE prophylaxis at our facility. Non-significant improvement was observed in appropriateness rates following anticoagulation improvement order set implementation. Future PPS and anticoagulation order set education is needed to increase awareness of low risk VTE patients who should not be prescribed pharmacologic VTE prophylaxis.

Learning Objectives:

Discuss the utility of various strategies described in current literature to increase optimal pharmacologic venous thromboembolism prophylaxis. Select the most appropriate venous thromboembolism risk stratification category given patient characteristics and co-morbidities.

Self Assessment Questions:

2. Based on current estimates, what percentage of hospitalized medically ill patients will develop a deep vein thrombosis if they do not receive pharmacologic venous thromboembolism prophylaxis?

- A 5-10%
- B 10-20%
- C 20-30%
- D 20-50%

1. Which of the following is considered a "best practice" risk assessment model for risk stratification and pharmacologic venous thromboembolism prophylaxis guidance in medically-ill hospitalized patients?

- A Padua Prediction score
- B Caprini assessment
- C Roger's score
- D 3-bucket model from UC San Diego

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-322L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PHARMACIST INTERVENTION USING METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS/METHICILLIN-SENSITIVE STAPHYLOCOCCUS AUREUS NUCLEIC ACID AMPLIFICATION TEST ON RESPIRATORY CULTURES IN INTENSIVE CARE UNIT PATIENTS

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Purpose: Antibiotic therapy that is active against methicillin-resistant *Staphylococcus aureus* (MRSA) is often empirically initiated in critically ill patients suspected of having pneumonia. Once anti-MRSA therapy is initiated in these patients, it may be difficult to de-escalate antibiotics due to current challenges with respiratory cultures, including suboptimal specimen collection and organism yield. A nucleic acid amplification test (NAAT) that identifies MRSA and methicillin-sensitive *Staphylococcus aureus* (MSSA) could be employed with rapid results that would be reliable even in the presence of antibiotics. This study seeks to evaluate the impact of a pharmacist-driven MRSA/MSSA respiratory NAAT on pneumonia therapy for ICU patients. **Methods:** This single-center prospective, quasi-experimental interventional study was conducted at Froedtert Hospital, a 500-bed academic medical center in Milwaukee, WI. The study included only ICU patients who had a respiratory culture specimen collected or were started on antibiotic therapy for suspected pneumonia. Clinical pharmacists ensured the MRSA/MSSA NAAT was ordered with respiratory culture. Upon NAAT result, the pharmacist would review and recommend antibiotic therapy adjustments, if necessary. Patients were excluded if pregnant or were transferred into Froedtert Hospital after receiving anti-MRSA therapy immediately prior to admission. The intervention was implemented January 1st, 2017 and data collected February 1st, 2017 through March 31st, 2017 (then compared to the same time period from the year prior). The primary outcome was average time to discontinuation of anti-MRSA therapy if found to be negative for MRSA on NAAT. Secondary outcomes included time to optimization of anti-staphylococcal antibiotics, days of anti-MRSA therapy per 1,000 patient days, average cost of anti-MRSA therapy in MRSA-negative patients, and incidence of acute kidney injury in patients receiving at least one dose of vancomycin. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss ongoing challenges with the current practice of treating patients with suspected pneumonia using anti-MRSA antibiotics.

Describe the MRSA/MSSA NAAT and explain why it does or does not have the potential to assist with earlier optimization of antibiotics in ICU patients with suspected pneumonia.

Self Assessment Questions:

The MRSA/MSSA NAAT can detect the presence of MRSA or MSSA for approximately how many days after treating a patient with broad spectrum antibiotics?

- A: 7 days
- B: 14 days
- C: 30 days
- D: 60 days

What "targeted anti-staphylococcal therapy" would you recommend if a patient has a negative MRSA but positive MSSA NAAT result?

- A: Provider should not de-escalate anti-MRSA therapy, such as vanc
- B: Provider should discontinue all anti-staphylococcal therapy
- C: Provider should continue to cover for MSSA, as well as other com
- D: Continue same therapy

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-611L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

COGNITIVE BEHAVIORAL THERAPY FOR INSOMNIA (CBT-I) WITH CONCURRENT ZOLPIDEM TAPERING

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Purpose: Though third-generation hypnotics are intended for short-term treatment of insomnia, these medications are often used long-term for chronic insomnia. The efficacy of these medications often decreases over time, and long-term usage is associated with various side effects and risks that are of particular concern in the veteran population, such as memory impairment and increased fall risk. CBT-I is a nonpharmacological treatment approach to chronic insomnia and has been found to retain efficacy long-term. One study by Zavesicka et al. assessed the outcomes of CBT-I with concurrent hypnotic tapering and demonstrated improved sleep outcomes. In response to this, a pilot program consisting of a combination of CBT-I with concurrent zolpidem tapering was provided at the William S. Middleton Memorial Veterans Hospital, and this study is a continuation of the novel service. A second offering of this service will be provided with the objective of further assessing the outcomes of this service in regard to sleep quality and zolpidem reduction/discontinuation. **Methods:** A retrospective chart review was first completed to identify patients with current zolpidem prescriptions for whom this service would not be appropriate. Outreach calls were then placed to offer appropriate candidates the CBT-I/zolpidem taper service. Those who expressed interest then met with the psychologist leading the group for initial sleep evaluation. The service itself consisted of seven sessions, consisting of including both conventional CBT-I treatment and zolpidem education/tapering plans provided by the pharmacist. The primary outcome is the percentage of patients who tapered off of zolpidem. Secondary outcomes included sleep efficiency, sleep latency, wake after sleep onset, and early morning awakenings, which were measured before treatment and at each CBT-I session.

Results/Conclusions: Data collection is ongoing with results and conclusions to be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain the rationale for tapering patients off hypnotics while completing CBT-I treatment.

Identify interventions pharmacists can make to improve patients sleep outcomes within the context of a CBT-I service.

Self Assessment Questions:

Which of the following is NOT a risk of long-term zolpidem use?

- A: Drowsiness
- B: Confusion
- C: Hallucinations
- D: Ototoxicity

Pharmacists can contribute to CBT-I treatment in which of the following ways?

- A: Design individualized zolpidem tapering plans
- B: Provide education regarding medications used for sleep
- C: Utilize motivational interviewing to engage patients in preferred tre
- D: All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-706L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF LOW DOSE FOUR-FACTOR PROTHROMBIN COMPLEX CONCENTRATE (PCC) FOR REVERSAL OF WARFARIN

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Background: Four-Factor Prothrombin Complex Concentrate (PCC) is FDA approved for the reversal of life-threatening warfarin-induced bleeding. Four-factor PCC carries significant risk for arterial and venous thromboembolic complications. A medication use evaluation (MUE) was performed to assess Four-factor PCC from May 2014-October 2016 at Advocate Lutheran General Hospital (ALGH). Results of this MUE included thrombotic complications in 13.7% (11/80) of patients compared to current literature, which cites a 1-7% event risk. Effective low dose PCC strategies are published in the literature, including a fixed dose of 1000 IU or 1500 IU (15 units/kg). To mitigate thrombotic complications and achieve an INR of less than 1.5, a low dose strategy including an initial 15 units/kg with a maximum initial dose of 1500 units was implemented. **Study Objectives:** The aim of this study is to assess differences in thrombotic complications pre- and post-implementation of low dose Four-Factor PCC. Secondary objectives include assessment of post-infusion INR, additional doses given, length of stay, time to thrombotic complication, mortality and cost savings. **Methods:** This is a prospective, single center chart review in patients who received Four-Factor PCC, post-implementation of a reduced dose strategy, from November 2016-present. The low dose strategy at our institution is 15 units/kg with maximum initial dose of 1500 units. If goal INR is not achieved post-PCC infusion, an additional dose, calculated from package insert recommendations minus previous dose administered, is given, with total dose not exceeding manufacturer recommendations. Baseline demographic and clinical data including dose, administration time, blood products received, and complications were collected. All normally distributed continuous variables will be compared using a Student's t-test and all categorical variables will be compared using Chi-square or Fisher's exact test. **Results and Conclusions:** Data collection and analysis is ongoing. The results and conclusions will be presented.

Learning Objectives:

Recall the complications associated with Four-Factor PCC.
Review the reduced dosing strategy of Four-Factor PCC.

Self Assessment Questions:

Which of the following complication of Four-Factor PCC has a rate of 1-7%?

- A Infusion related reactions
- B: Arterial and venous thrombosis
- C: Nausea and vomiting
- D: Increased serum transaminases

A 70 kg patient on warfarin for atrial fibrillation presents with an aSAH; INR on admission is 4.3. Using the reduced dose strategy, what is the exact initial dose the patient will receive? Current pH

- A 1750 units
- B 3500 units
- C 1050 units
- D 1280 units

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-526L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

LACTATED RINGERS AND NORMAL SALINE: THE TALE OF TWO FLUIDS

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Purpose: Lactated Ringers solution, which is considered a "balanced" IV crystalloid solution, contains electrolytes more similar to plasma than does 0.9% sodium chloride solution. The administration of these balanced solutions could lead to less electrolyte abnormalities and reduce the amount of additional electrolyte replacement. There have been no studies evaluating the effects on potassium of administering lactated ringers solution as fluid resuscitation in patients compared to normal saline. The purpose of this study is to evaluate potassium replacement in patients receiving fluid resuscitation with lactated ringers. **Methods:** This is a single center, retrospective observational cohort comparing the effects, safety, and costs of fluid resuscitation in patients with either lactated ringers or 0.9% sodium chloride solutions. Patients were identified in the electronic medical record by the total fluid volume of either lactated ringers or 0.9% sodium chloride solution received in the initial 24 hours after presenting to an intensive care unit (ICU) from November 2013 to October 2016. Patients were included in this study if they were at least 18 years of age, were admitted to an ICU within 24 hours of presentation, were placed on the ICU electrolyte replacement protocol and received at least 30 mL/kg of a study fluid. Patients were excluded if they were pregnant, had beta-hydroxybutyrate >1, received TPN prior to or during the first 48 hours of admission or had a history of short-bowel syndrome. Patients were matched based on total 24 hours replacement of each fluid based on milliliter per kilogram along with baseline potassium level on presentation. Primary outcome was assessed based on potassium replacement between the groups in the 48 hours following initial fluid resuscitation. Secondary outcomes assessed included incidence of hyperkalemia and subsequent treatment. **Conclusion:** Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference

Learning Objectives:

Recognize the physiologic effects of certain electrolyte abnormalities
Recall components of different crystalloid solutions

Self Assessment Questions:

What clinical feature can occur with hypokalemia?

- A Peaked T-wave on the ECG
- B: Central pontine myelinolysis
- C: T-wave flattening of the ECG
- D: Central diabetes insipidus

How many mEq of potassium are in 1 liter of lactated ringers solution?

- A 0
- B 4
- C 8
- D 10

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-637L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTING SYSTEM CHANGES TO REDUCE THE NUMBER OF PHARMACIST ORDER CLARIFICATIONS WITHIN THE ELECTRONIC HEALTH RECORD (EHR)

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Purpose: Order clarifications inputted into the electronic health record (EHR) occur in the thousands and are a time consuming part of pharmacist workflow. This quality improvement effort aims to provide a more detailed analysis on what is contributing to order clarifications with the intention of implementing system changes targeting the source of these clarifications. **Methods, Phase 1:** Obtained a three-month historical extract of pharmacist order clarification interventions from the EHR, by combining two methods of a pareto chart and standardization against their relative number of medication orders, we produced a set of medications that caused the majority of order clarifications. A detailed subgroup analysis based on associated medication order characteristics was performed to identify the common causes of order clarifications and determined what system changes within the EHR would have the greatest impact on reducing the requirements for order clarifications. **Methods, Phase 2:** Implementation of system changes in the EHR done through a series of plan-do-study-act (PDSA) cycles. Statistical Process Control (SPC) methods are used to determine the overall effect of each change. In order to determine statistical significance of the interventions, a comparison of order clarification averages pre- and post-system change using a t-test will be performed.

Results: System changes discussion with the appropriate individuals and/or committees meant only changes for enoxaparin and morphine were implemented. Enoxaparin required smarter order instructions that include logic to drive recommendations based on BMI, CrCl and weight. Morphine interventions include the addition of dynamic description to avoid morphine PCA in renal impairment patients, an alert was made for duplicate morphine PCA orders, and dynamically adapting PCA order sets to ensure naloxone is always ordered. This project emphasized some improvement initiatives such as cefepime dosing guidelines, standardized definition of HIT, and new integration of EKG data into the EHR.

Learning Objectives:

Recognize the value of order clarifications performed by pharmacists within the EHR

Explain the effectiveness of system changes on the number of targeted order clarifications

Self Assessment Questions:

Order clarifications are a representation of what?

- A: An individual's lack of clinical or operational knowledge
- B: A gap in the electronic health record (EHR) system
- C: An opportunity to improve the system
- D: Both B & C

What do the results of system changes on order clarification demonstrate?

- A: Clinical decision support can facilitate communication between clinicians
- B: Alerts hinder the decision making process by distracting clinicians
- C: Dynamic presentation of information improves decision making
- D: Changes need to occur with individuals not the system

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-807L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION OF TECH-CHECK-TECH IN THE COMMUNITY SETTING

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Purpose: The purpose of this project is to develop and implement tech-check-tech (TCT) in the community setting for the expansion of patient care services provided by pharmacists. Wisconsin law mandates that a pharmacist perform the final product verification for all prescriptions being dispensed. Through variances granted by the Wisconsin Pharmacy Examining Board, this project will implement TCT in two outpatient pharmacies in a large, integrated health system and evaluate the safety of TCT in the community setting under the scope of the Pharmacy Society of Wisconsin's pilot study. **Methods:** Under PSW's pilot project, two outpatient pharmacies in a large, integrated health system implemented the use of specially trained technicians to perform the final product verification in an effort to increase pharmacist time available for direct patient care services. First, an initial assessment was performed to determine pharmacists' checking accuracy for final product verification as well as baseline pharmacist time allocation towards patient care services prior to TCT implementation. After receiving Pharmacy Examining Board approval at each site, validated pharmacy technician (VPT) candidates were trained using both online learning modules and hands-on practical training. Once trained, each VPT candidate completed an initial validation which required 1000 final product verification checks with at least 99.8% accuracy. After validation, each pharmacy proceeded to operate under the new TCT workflow. To ensure accuracy while practicing TCT, a licensed pharmacist performed quality assurance checks of at least 5% of the prescription products checked by a VPT each day. During the new workflow, data was collected to determine the error rate of VPTs as well as pharmacist time reallocation. **Results and Conclusion:** Pharmacists' checking accuracy and baseline of current patient care services is currently being collected. Following collection and technician validation, data will be collected on technician accuracy and pharmacist time reallocation using the TCT workflow.

Learning Objectives:

Identify how many states allow for the practice of tech-check-tech

List at least 5 outpatient pharmacy services beyond the typical dispensing workflow

Self Assessment Questions:

What is the current state of community tech-check-tech nationally?

- A: Community tech-check-tech is allowed in all 50 US states.
- B: Community tech-check-tech is allowed in none of the 50 US states.
- C: Community tech-check-tech is allowed in less than half of the 50 US states.
- D: Community tech-check-tech is allowed in more than half of the 50 US states.

Which of the following services have pharmacists previously implemented to improve patient care in the outpatient setting?

- A: Increase patient wait times
- B: Offer immunizations
- C: Provide inadequate consultations
- D: Administer IV medications

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-796L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ASSESSMENT AND IMPLEMENTATION OF A HEMATOLOGY-ONCOLOGY MEDICATION MANAGEMENT PHARMACIST SERVICE

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Purpose: Pharmaceutical research continues to expand the oral treatment options for hematologic and oncologic conditions. Advances allow patients convenience of treatment in their home and the potential for increased quality of life. Despite the benefits of options for patient-driven care plans, these high-risk and high-cost medications present a challenge for health systems. Oral oncology and hematology regimens come with possible barriers to adherence: low health literacy, complex regimens, and potential for adverse effects. Many insurers and health systems are utilizing specialty pharmacy services to address the needs of patients to improve outcomes and adherence. The purpose of this project is to assess how the implementation of a specialty medicine management program at a Veterans Affairs hospital could create potential cost avoidance, improvement in adherence, and increased efficacy of hematologic medications, ideally to set the foundation for more robust pharmacist-driven oncology management in the future.

Methods: A retrospective chart review and prospective evaluation was designed to assess the current state of hematologic medication management. Hematology clinic patient charts will be reviewed and the following information collected: demographics, current treatment regimen, proportion of days covered, adverse event rate, changes in therapy, monitoring parameters, performance status, Charlson Comorbidity Index, and palliative care involvement. In addition, patients who have a scheduled visit with their hematology provider within the next 7 to 10 days will be contacted by a pharmacist to address possible side effects, barriers to adherence, patient concerns, or to determine if a change in therapy is anticipated. If a change in therapy is anticipated, the pharmacist will hold the patients next refill and contact the provider for further assessment. Primary outcomes to be assessed include cost avoidance by preventing unnecessary refills and identification of gaps in the current hematology clinic practice where pharmacist involvement may provide improved quality and safety of oral medication therapy.

Results: In progress.

Learning Objectives:

Identify the benefits of using a specialty medication management model within a health system.

Recognize the pharmacists role in improving outcomes with high-risk medications.

Self Assessment Questions:

According to the Pharmacy Forecast, what percentage of health systems will be able to document that their formal programs for managing patients receiving specialty medications significantly improve patient adherence?

- A: 10%
- B: 25%
- C: 35%
- D: 45%

Which of the following are possible benefits of implementing specialty pharmacy services for high-risk and high-cost medications?

- A: Improved medication adherence
- B: Reduced medical and pharmacy costs
- C: Improved outcomes
- D: All of the above

Q1 Answer: B Q2 Answer: D

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Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF PHARMACIST ATTENDANCE ON ACUTE CODE STROKE WITH ADMINISTRATION OF ALTEPLASE

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Stroke is a leading cause of mortality and morbidity in the United States. Current stroke guidelines recommend the administration of intravenous alteplase within 4.5 hours of symptom onset in the setting of acute ischemic stroke. Timely treatment is essential to salvage the damaged tissue caused by loss of blood flow. In June 2014, the institution implemented a code stroke team to assure rapid, consistent assessment and initiation of treatment for patients presenting with acute stroke symptoms. The purpose of this study is to evaluate if the participation of a pharmacist at a code stroke expedites the process of alteplase administration. This is a retrospective analysis of patients age 18 years and older who received intravenous alteplase for acute ischemic stroke between June 2014 to January 2017. Patients included in the study are divided into two groups: group A include patients receiving alteplase from 7:00 to 21:00 while a pharmacist attends code stroke, and group B include patients receiving alteplase from 21:01 to 6:59 while pharmacist is not on duty to attend the code stroke. Exclusion criteria include patients who are pregnant or incarcerated. The primary endpoint of the study is time to bolus of intravenous alteplase from the time of order. Secondary endpoints include onset of stroke symptoms to alteplase bolus, time of code stroke call to initial alteplase bolus, correct alteplase dosing, bleed on computerized tomography scan, hospital length of stay and in-hospital mortality. All data and patient information, including demographic and clinical characteristics, will be collected through the review of electronic medical records. Continuous data will be analyzed using an independent samples t-test or Mann Whitney U as appropriate. Categorical endpoints will be analyzed using a chi-square or Fisher's exact test as appropriate. All tests will show significance with a p-value of less than 0.05.

Learning Objectives:

Recognize current AHA/ASA guideline recommendations regarding the window of time for intravenous alteplase administration in the setting of acute ischemic stroke.

Explain the reason for why it is essential to administer alteplase in a timely manner.

Self Assessment Questions:

How many hours within symptom onset should intravenous alteplase be administered for acute ischemic stroke according to current AHA/ASA guidelines?

- A: ≤ 2 hours
- B: ≤ 3.5 hours
- C: ≤ 4.5 hours
- D: ≤ 5.5 hours

Why is timely manner of alteplase important in the setting of acute ischemic stroke?

- A: In order to decrease the likelihood of intracranial hemorrhage
- B: In order to salvage the damaged tissue caused by loss of blood flow
- C: In order to use the alteplase prior to its expiration time
- D: In order to decrease hospital length of stay

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-801L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DEVELOPMENT OF BEST PRACTICE RECOMMENDATIONS REGARDING SAFE USE OF PULMONARY HYPERTENSION PHARMACOTHERAPIES IN ADULTS USING A MODIFIED DELPHI METHOD WITH AN EXPERT PHARMACIST PANEL

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Purpose: Pulmonary hypertension (PH) is managed by complex pharmacotherapies that require ambulatory infusion devices and/or enrollment in a REMS program. The purpose of this study is to develop best practice recommendations (BPR) surrounding use of medications at centers caring for adult PH patients. Methods: Pharmacists with expertise in PH medications were identified by contacting pharmacy leadership at PH Comprehensive Care Centers accredited by the Pulmonary Hypertension Association. Leadership referred a pharmacist considered to be an expert at their center. For inclusion, experts must have met two of the following criteria: (1) pharmacy point person for adult PH within respective institution, (2) provide direct care to adult PH patients (3) involved in developing policies, presentations or publications pertaining to use of PH pharmacotherapies. Experts received a survey to collect demographic information. Investigators developed the first version of BPR statements with rationale and references. In round 1 of a 4-round Delphi process, experts critiqued version 1 of the BPR. In round 2, experts critiqued version 2 of BPR. Investigators revised BPR based on input after each aforementioned round. In round 3, experts voted on version 3 of BPR via an electronic survey using a Likert scale. The scale ranged from 1 "strongly disagree" to 5 "strongly agree". Panel consensus agreement, equivocal, or consensus disagreement were defined as a median Likert score of > 3.75 , $3.75-2.5$ or < 2.5 , respectively. BPR with consensus agreement, consensus disagreement or equivocal were accepted for the final version, rejected from the final version or moved on to round 4, respectively. In round 4, experts voted via teleconference to either "accept" or "reject" BPR by majority decision. BPR from round 4 were given a lower level of recommendation. Analyses used descriptive statistics and it was IRB approved. Results and Conclusions: Results and conclusion will be presented at GLPRC.

Learning Objectives:

Describe medication safety concerns associated with the use of pulmonary hypertension (PH) pharmacotherapies
Recognize important steps in utilizing the modified Delphi method in developing consensus recommendations

Self Assessment Questions:

Which of the following are considered a safety concern(s) pertaining to the use of PH pharmacotherapies in an inpatient setting?

- A: Failing to confirm female patient and physician enrollment in the
- B: Incorrect dosing of epoprostenol IV administered by a CADD Lega
- C: Abrupt discontinuation of epoprostenol IV because of a CADD Leg
- D: Any of the above may be considered a safety concern pertaining to

An important step of the Delphi method include(s) which of the following

- A: When reaching a consensus is difficult or consensus is unclear, a
- B: Creation of a homogeneous group of experts
- C: Having at least four rounds of questionnaires and/or voting
- D: All of the above are important steps in the Delphi method

Q1 Answer: D Q2 Answer: A

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(if ACPE number listed above)

ADDRESSING INAPPROPRIATE USE OF STRESS ULCER PROPHYLAXIS IN THE HOSPITAL SETTING

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Purpose: Inappropriate use of stress ulcer prophylaxis has been previously described in the hospital setting. Use of acid suppression medications should be limited, given the numerous adverse effects related to these medications. The goal of this project is to reduce the inappropriate use of acid suppression medications. Methods: This project first assessed the current use of acid suppression medication at Aurora St. Lukes Medical Center (ASLMC). A retrospective chart review was completed to determine if use of acid suppression medications was appropriate, and included a total of fifty patients receiving either a histamine-2 receptor antagonist (H2RA) or a proton pump inhibitor (PPI) during hospital admission. Patients on either medication prior to admission, or that expired during hospital admission were excluded. Based on analysis of the data collected, the project will seek to 1) remove stress ulcer prophylaxis from non-intensive care unit order sets in order to prevent unnecessary ordering, 2) integrate a monitoring tool into the electronic health record (EHR) to assist pharmacists in determining whether acid suppression medications are appropriate, and 3) establish pharmacist authority to discontinue inappropriate stress ulcer prophylaxis. Given approval of the proposed interventions, a post-implementation retrospective chart review will again be performed to determine if inappropriate use of acid suppression medications was reduced.

Learning Objectives:

List adverse effects related to use of acid suppression medications
Describe indications for stress ulcer prophylaxis according to the 1999 ASHP Therapeutic Guidelines on Stress Ulcer Prophylaxis

Self Assessment Questions:

Which of the following is an adverse effect associated with use of proton pump inhibitors?

- A: Increased risk of Clostridium difficile infections
- B: Hypermagnesemia
- C: Altered mental status
- D: Hyperglycemia

Based on the 1999 ASHP Therapeutic Guidelines on Stress Ulcer Prophylaxis, which of the following is an independent indication for use of stress ulcer prophylaxis?

- A: Length of stay in an intensive care unit > 1 week
- B: Acute kidney injury
- C: Mechanical ventilation > 48 hours
- D: Hepatic failure

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-519L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DEVELOPING AND IMPLEMENTING PHARMACY MANAGEMENT OF OPIOID-INDUCED CONSTIPATION

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Purpose: With pain management a commonly sought metric, specifically within the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) reports, hospitals continuously explore opportunities of improvement. Adverse reactions to common medications can complicate control of a patient's pain and hinder ability of appropriate management. Literature suggests that upwards of 50% of patients receiving opioids can develop constipation and prophylactic regimens may not ameliorate the problem completely. Currently, treatment of opioid-induced constipation (OIC) is inconsistently applied to our inpatient population and pharmacists are uniquely positioned to intervene. This project standardizes the identification of patients at risk for developing opioid-induced constipation and pharmacists management with low-cost, effective treatments. **Methods:** A treatment algorithm guiding pharmacists OIC interventions was constructed utilizing bowel regimen protocols found in literature and approved by the site physician champion. A tool was built into the hospital's electronic medical record system to streamline the pharmacists assessment of OIC and identify aggravating medications. Interventions will be provided to prescribers using a standardized format via direct messages through the electronic health record. A pilot program will be conducted utilizing this new tool and treatment algorithm, and the data will be compared to baseline data which demonstrated that over 50% of patients receiving multiple doses of opioid medications did not receive any laxative administration. In addition, constipation diagnoses in patients receiving opioids without laxative administration will be evaluated as this occurred in nearly 14% at baseline. **Results:** Collection of results and analysis of the pilot study is currently being completed, and will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify potential consequences of a patient developing opioid-induced constipation

List medications that can be used as first-line agents for the treatment of opioid-induced constipation

Self Assessment Questions:

Which of the following is a potential consequence of the development of opioid-induced constipation?

- A: Improved pain management for a patient
- B: Decreased length of stay for inpatients
- C: Negative impact on HCAHPS scores
- D: Positive impact on HCAHPS scores

Which of the following agents should be considered as a second-line treatment for opioid-induced constipation?

- A: Polyethylene glycol
- B: Senna
- C: Naloxegol
- D: Bisacodyl

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-602L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

MINIMIZATION OF VARIABILITY IN THE MANAGEMENT OF ONCOLOGIC EMERGENCIES

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Introduction: Oncologic emergencies, including hypercalcemia of malignancy, tumor lysis syndrome, and spinal cord compression, require immediate intervention to prevent morbidity and mortality. Previous studies show that implementation of order-sets for medical emergencies requiring rapid treatment leads to quicker drug administration, decreased hospital length of stay, and decreased in-hospital mortality. University of Wisconsin Health (UW Health) does not currently have a clinical practice guideline or order-sets addressing oncologic emergencies. **Purpose:** The purpose of this project is to enhance prompt and appropriate evidence-based treatment initiation while minimizing treatment variability of oncologic emergencies. **Methods:** A multidisciplinary workgroup will collaborate to design and implement strategies to facilitate oncologic emergency treatment. These strategies include the creation of a clinical practice guideline and oncologic emergency-specific order-sets for prescribing and lab monitoring that will assist in clinical decision making. The order-sets will be provider-centric to minimize click fatigue. Once created, the information will be disseminated across multidisciplinary teams to facilitate education and ensure accurate use of the guideline and order-sets. A link to the clinical practice guideline will be added to pertinent medication records. Other implementation tactics are being explored to ensure the use of the clinical practice guideline and order-sets continues beyond the conclusion of this project. **Preliminary results:** The project is expected to result in a clinical practice guideline and oncologic emergency-specific order-sets with the goal of facilitating prompt treatment, minimizing treatment variability, and enhancing interprofessional education. Results will be shared after implementation and data collection has occurred. They will focus on variability in the management of oncologic emergencies and time to appropriate medication administration. **Conclusions:** An oncologic emergency clinical practice guideline and supporting order-sets are expected to decrease variability in management and decrease time to appropriate medication administration.

Learning Objectives:

Describe the process of clinical practice guideline and order-set development at an academic medical center

Discuss the implementation of a clinical practice guideline and order-set at an academic medical center

Self Assessment Questions:

Which of the following represent the appropriate clinical practice guideline development process?

- A: Create of a clinical practice guideline, assemble of interprofession
- B: Approval through Pharmacy and Therapeutics Committee, assem
- C: Evaluate available literature, assemble of interprofessional team a
- D: Assemble of interprofessional team and notify key stakeholders, e

Which of the following is the most effective intervention to ensure appropriate implementation?

- A: Education and training
- B: Forcing functions
- C: Reminders, checklists, and double checks
- D: Computer automation

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-465L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

A SURVEY OF PATIENT, PROVIDER, AND PAYOR PERSPECTIVES ON BIOSIMILARS

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As biosimilars are relatively new, potential barriers to the utilization of these medications by patients, prescribers, and payors remain unknown. Being potential distributors of biosimilars, specialty pharmacies must understand such barriers to maximize their ability to provide products and services to all three parties. This study aims to provide data on barriers to biosimilar utilization. Secondary objectives will validate previously published literature and update current state of biosimilar opinions. The outcomes of this study will be used to update services provided by a specialty pharmacy and further define barriers to biosimilar utilization within these populations. This study will take place in the headquarters of a national specialty pharmacy. A prospective survey specific to each target population will be distributed to patients, providers, and payors. Five-hundred randomly selected patients who received a shipment from the specialty pharmacy of Humira (adalimumab), Enbrel (etanercept), Remicade (infliximab), Neupogen (filgrastim), Zarxio (filgrastim-sndz), or Granix (tbo-filgrastim) between Dec. 8-13, 2016, will receive a survey, as will 500 randomly selected providers that ordered at least one of these medications shipped during this period. All managed care payors contracted with the specialty pharmacy as of Dec. 14, 2016 will receive a survey. The patient and provider surveys will assess knowledge of biosimilars, barriers to utilization of biosimilars, and preferred patient educator and education material on biosimilars. The payor survey will assess barriers to utilization of biosimilars, primary pharmacoeconomic evaluators for drug products, opinion on specialty pharmacy's role and ability to manage utilization and cost of biosimilars, plans to address the use of biosimilars, preferred member educator, and preference of education materials. All survey responses recorded will be compliant with the Health Insurance Portability and Accountability Act. The primary endpoints will be analyzed using descriptive statistics. Results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review the pathway for FDA approval of biologic and biosimilar medications.

Identify potential patient, provider, and payor barriers to biosimilar utilization through previously published data and report new study results.

Self Assessment Questions:

Which law gives the FDA authority to approve biosimilars?

- A: Biologics Control Act
- B: Biologics Price Competition and Innovation Act
- C: Prescription Drug Marketing Act
- D: Food, Drug, and Cosmetic Act

Which of the following is a potential barrier to biosimilar utilization?

- A: An abundance of readily available information on biosimilars
- B: Evidence of worse safety and efficacy profiles relative to reference
- C: Potentially higher costs of biosimilars
- D: Limited safety and efficacy data available prior to FDA approval

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-879L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF IN-UTERO EXPOSURE TO SELECTIVE SEROTONIN REUPTAKE INHIBITORS AND OPIOIDS ON NEONATAL ABSTINENCE SYNDROME

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Purpose: The use of opioids and antidepressants during pregnancy is widespread and the incidence of infants born with neonatal abstinence syndrome (NAS) has steadily increased over the past decade. Prenatal exposure to both of these drug classes can have significant impact on the neurobehavior of infants often leading to long, complex, and costly hospitalizations. The objective of this study is to compare short term outcomes of NAS treatment in infants exposed in-utero to opioids alone or opioids plus selective serotonin reuptake inhibitors (SSRIs). **Methods:** This single-center retrospective cohort study has been approved by the University of Michigan Institutional Review Board. All infants admitted to the Brandon Newborn Intensive Care Unit (NICU) at C.S. Mott Children's Hospital between January 2009-July 2016 meeting criteria will be identified through electronic health records and the Vermont Oxford Network (VON) database. Infants will be grouped into two cohorts based on in-utero exposure to an opioid alone or an opioid plus an SSRI. Infants whose mother received an opioid or an opioid plus an SSRI and was greater or equal to eighteen years of age with a gestation greater or equal to thirty-four weeks and who required treatment for NAS with methadone at a postnatal age of less than or equal to seven days of life based on NICU treatment guidelines will be included in the study. Infants will be excluded if they received methadone for treatment of iatrogenic withdrawal or were prenatally exposed to psychotropic medications other than SSRIs. Neonatal and maternal demographic data will be collected. Additionally, the following data points will be collected: max Finnegan score, time to symptom control, length of methadone treatment, length of hospitalization, cumulative methadone dose, second medication use, and discharge therapy. **Results/Conclusions:** Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the classic triad of NAS

Identify the most common antidepressant class used during pregnancy

Self Assessment Questions:

NAS results in which of the following effects?

- A: Central nervous system hyperirritability
- B: Gastrointestinal disturbances
- C: Autonomic nervous system dysfunction
- D: All of the above

Which of the following is the most frequently used class of medications for the treatment of depression during pregnancy?

- A: Serotonin-norepinephrine reuptake inhibitors (SNRIs)
- B: Monoamine oxidase inhibitors (MAOIs)
- C: Selective serotonin reuptake inhibitors (SSRIs)
- D: Tricyclic antidepressants (TCAs)

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-455L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
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EVALUATION OF ALBUMIN 25% USE IN CRITICALLY ILL PATIENTS

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Purpose: Albumin is a plasma protein that maintains colloid osmotic pressure (COP), which is a major determinant of fluid movement between interstitium and vasculature. Albumin levels account for approximately 75-80% of total COP and is therefore frequently used for volume expansion in resuscitation and maintenance of oncotic pressure. While serum levels are increased with administration, there has been no difference in intensive care unit (ICU) and hospital lengths of stay, mortality, or ventilator dependence when compared to crystalloid for general volume resuscitation or albumin supplementation. Clinical indications in which albumin 25% has been studied include large volume paracentesis, acute respiratory distress syndrome, vasospasm post subarachnoid hemorrhage (SAH), hepatorenal syndrome (HRS), and spontaneous bacterial peritonitis (SBP). The American Association for the Study of Liver Diseases support the use of albumin for the following indications; HRS, SBP, and large volume paracentesis. The American Heart Association/American Stroke Association support the use of albumin for volume expansion during vasospasm post-SAH. Currently, albumin is relatively expensive compared to crystalloid options. Given the increased cost associated with albumin 25% and limited populations where it may provide benefit, this study seeks to evaluate the prescribing practices of albumin 25% at a large, tertiary, academic medical center. **Methods:** This non-interventional, descriptive study was conducted between June 1, 2015 and June 30, 2016 with the primary objective to describe the prescribing patterns and indications for use of albumin 25% within Cleveland Clinic ICUs. Secondary objectives included comparing albumin 25% patterns of use with indications and dosing regimens that are supported by primary literature or treatment guidelines, evaluating costs associated with albumin 25% therapy, and pharmacy turnaround time. **Results/Conclusion:** Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss possible indications for albumin 25% based on available guidelines and primary literature

Identify the prescribing patterns of albumin 25% at the Cleveland Clinic main campus

Self Assessment Questions:

In 2004, the American Thoracic Society listed which of the following as a recommended indication for the use of colloid administration?

- A: Traumatic brain injury
- B: Volume resuscitation
- C: Large-volume paracentesis
- D: Pneumonia

What literature based albumin 25% dose does the American Association for the Studies of Liver Diseases recommend for spontaneous bacterial peritonitis (SBP)?

- A: 1 g/kg on day one, followed by 20-40 g daily up to 14 days
- B: 1.25 g/kg/day for 7 days
- C: 1.5 g/kg on day one, followed by 1 g/kg on day 3
- D: 25 g every 8 hours for 48-96 hours +/- loop diuretics

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-515L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
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EFFECT OF POST-BLEED NON-STEROIDAL ANTI-INFLAMMATORY DRUG USE ON INTRACRANIAL HEMORRHAGE PROGRESSION

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Purpose: A common complication in the acute phase of intracranial hemorrhage is fever. In subarachnoid hemorrhage patients, fever has been associated with increased mortality, disability, and cognitive impairment. Thus, fever is treated vigorously in this population, typically with acetaminophen. Non-steroidal anti-inflammatory drugs are not typically used for fever control in the intracranial hemorrhage population due to their antiplatelet effects via cyclooxygenase-1. The purpose of this study is to determine if non-steroidal anti-inflammatory drug use in intracranial hemorrhage leads to an increase hematoma volume or significant bleeding. **Methods:** This retrospective study evaluated adult patients with spontaneous intracranial hemorrhage as identified by a stroke database review. The patient population was obtained from a Level I trauma center between January 1st, 2013 to December 31st, 2015. The primary outcome of this study was progression of intracranial hemorrhage on computerized tomography imaging 24 to 72 hours after non-steroidal anti-inflammatory drug administration. Secondary outcomes included in-hospital mortality, intensive care unit length of stay, and hospital length of stay. Exposure to non-steroidal anti-inflammatory drugs was categorized by drug, dose, and number of administrations. In order to determine progression of intracranial hemorrhage, neurosurgery practitioners assessed computerized tomography scans of subjects at baseline and 24 to 72 hours after non-steroidal anti-inflammatory drug exposure. The amount of midline shift and hematoma volumes were assessed. Progression was described as stable, clinically insignificant progression, or clinically significant progression. Patients were included if they were diagnosed with a non-traumatic intracranial hemorrhage within 48 hours of onset. Patients were excluded if they had a history of coagulation disorder, benign hematologic disorder, were initiated on warfarin or aspirin during their admission, or were initiated on a heparin infusion with a partial prothrombin time greater than 60 seconds. **Results:** To be presented at Great Lakes Pharmacy Residency Conference (GLPRC) **Conclusions:** To be presented at GLPRC

Learning Objectives:

Describe current treatment strategies for the management of fever in intracranial hemorrhage patients

Explain the importance of maintaining hemostasis and hematoma stability in the acute phase of intracranial hemorrhage

Self Assessment Questions:

Which of the following interventions for the treatment of fever has been established to be safe and effective in subarachnoid hemorrhage patients?

- A: Ibuprofen 400 mg by mouth every 6 hours
- B: Acetaminophen 650 mg by mouth every 4 hours
- C: Ketorolac 30 mg intravenous every 6 hours
- D: Meloxicam 15 mg by mouth every 24 hours

Which of the following is true concerning intracranial hemorrhage progression?

- A: Hematoma expansion is a rare complication in intracranial hemorrhage
- B: Hematoma expansion has been shown to lead to increased in-hospital mortality
- C: Intracranial hemorrhage progression has not been shown to lead to increased in-hospital mortality
- D: Hematoma expansion has been shown to lead to decreased functional outcomes

Q1 Answer: B Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-612L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PHARMACIST IMPACT IN A PHYSICIAN-OWNED MEDICAL GROUP PRACTICE SITE

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As Medicare quality measures have transitioned towards a value-based payment (VBP) model, pharmacists have greatly impacted patient care. They have the unique expertise to extend physicians in targeted chronic disease state management and have shown improved patient outcomes through collaboration. While literature shows that pharmacists positively impact patient care, the utilization of pharmacists within a physician-owned medical group primary care clinic has not been described in the literature. The primary endpoint of this study is to describe the utilization of pharmacists newly positioned in this setting in order to foster the development of reproducible and impactful workflow models leading to improved patient outcomes. The secondary endpoints of this study are to describe the clinical impact of the pharmacist on patient care. This is a retrospective descriptive review of the first six months of a clinic pilot involving one clinical pharmacy specialist and three rotating PGY2 Ambulatory Care Pharmacy residents. Patients were included if they underwent pharmacist review for targeted disease state management (diabetes, statin intolerance, COPD, osteoporosis) or medication therapy review. Patients could be referred by physician or via pharmacist screening of the schedule. Chart review will be conducted on these patient encounters including patient characteristics, referral information, and pharmacist encounter information. Expected results of this study include primarily descriptive data of approximately 100 patients seen by a pharmacist over the course of five months in this clinic setting. Categorical variables will be presented as frequency and percent. Normally distributed continuous variables will be presented as mean and standard deviation. Continuous variables will be presented as median with 25-75% interquartile range. Results will be presented at the Great Lakes conference in April.

Learning Objectives:

Describe utilization of pharmacists in the ambulatory care setting
Describe impact of pharmacists in an interdisciplinary team on patient care

Self Assessment Questions:

What are potential reasons for increased need for pharmacists in the ambulatory care setting nationally?

- A As life expectancy prolongs, patients are developing more comorbidities
- B Projected deficiency of primary care physicians in the next 10 years
- C Increase in value-based payment or shared savings models
- D All of the above

When describing a clinical service, what variables are essential to success in the clinic?

- A Understand physician goals/priorities
- B Standardizing processes and procedures
- C Collecting metrics to defend value
- D All of the above

Q1 Answer: D Q2 Answer: D

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URIC ACID LEVEL MONITORING AFTER INITIATION OF URATE LOWERING THERAPY IN VETERANS WITH GOUT

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Purpose: Gout is a disorder that results from increased uric acid (UA) levels, and is associated with debilitating pain and high recurrence rates. Per the 2012 American College of Rheumatology guidelines, pharmacologic urate lowering therapy (ULT) is recommended for patients with tophus, frequent gout attacks (≥ 2 attacks/year), patients with chronic kidney disease stage 2 or worse (glomerular filtration rate ≤ 89 mL/min), or past urolithiasis. Minimum target serum UA level should be < 6 mg/dL, with potential lowering to < 5 mg/dL for patients with greater disease severity. In 2016, the European League Against Rheumatism published expanded criteria for ULT initiation due to possible cardiovascular and renal benefits from decreased UA load. Results of a retrospective study at Jesse Brown VA Medical Center (JBVAMC) in 2016 indicated an opportunity for more aggressive ULT initiation and monitoring within the Veteran population. The purpose of this study is to evaluate the use of ULT in patients with diagnosis of gout, specifically monitoring of serum UA levels after ULT initiation.

Methods: This study is a retrospective, electronic chart review of patients at JBVAMC and will evaluate new allopurinol and febuxostat prescriptions from January 1, 2014 through September 30, 2015. Information will be collected for up to 12 months after fill of the initial ULT prescription. It is estimated that 650 subjects will be reviewed, with a goal of enrolling 400. The primary endpoint is percent of patients with serum UA level checked within 12 months of ULT initiation. Secondary endpoints include percent of patients with baseline UA level, achievement of serum UA level < 6 mg/dL, average allopurinol starting dose, magnitude of allopurinol dose titration, percent of patients prescribed anti-inflammatory prophylaxis, ULT adherence, and utilization of services for gout-related problems.

Results/Conclusions: Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the minimum target serum uric acid level for a patient with diagnosis of gout who is initiated on urate lowering therapy.
Select an allopurinol starting dose for a patient who meets criteria for ULT initiation as per the American College of Rheumatology 2012 guidelines.

Self Assessment Questions:

1. What is the minimum target serum uric acid level for a patient with gout who is initiated on urate lowering therapy?

- A < 8 mg/dL
- B < 7 mg/dL
- C < 6 mg/dL
- D < 5 mg/dL

2. What is an appropriate dose of allopurinol and indication for ULT initiation per the American College of Rheumatology 2012 guidelines?

- A Allopurinol 100 mg daily in a patient with normal renal function and no contraindications
- B Allopurinol 200 mg daily in a patient with normal renal function and no contraindications
- C Allopurinol 100 mg daily in a patient with chronic kidney disease stage 2 or worse
- D Allopurinol 200 mg daily in a patient with normal renal function and no contraindications

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

SYSTEMATIC APPROACH TO STANDARDIZE THE INITIAL MANAGEMENT OF HYPERSENSITIVITY REACTIONS IN CANCER PATIENTS

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Background: Systemic agents are critical in the treatment of cancer, but many therapies are associated with possible hypersensitivity reactions. Variability of hypersensitivity reactions leads to inconsistent management and ultimately to inappropriate emergency medication administration, unnecessary treatment discontinuation and limited options for future treatment. **Purpose:** The purpose of this project is to standardize the initial management of hypersensitivity reactions associated with medications used to treat cancer patients within UW Health. The standardization will improve patient safety and increase efficiency of chemotherapy administration. **Methods:** A multidisciplinary team was created to analyze current practice at UW Health for managing hypersensitivity reactions by determining which emergency medications are utilized for initial management, the rate of reactions with certain agents used to treat cancer, and the outcomes of patients associated with current approaches. The literature was evaluated to determine the most appropriate medications, including timing and dosing strategies, used to initially manage hypersensitivity reactions. National list serves were queried to investigate the practice of peer institutions. The collected information was used to create a clinical practice guideline to be used by healthcare providers to provide standardized initial management of hypersensitivity reactions in cancer patients. Pre and post implementation data is being collected to evaluate the impact of the guideline, including which emergency medications were utilized, the outcomes of patients, chair time associated with the administration of certain agents, and nursing satisfaction.

Learning Objectives:

Discuss hypersensitivity reactions, including incidence and impact on patient safety and efficiency of medication administration.

Explain hypersensitivity reaction symptom identification, emergency medication selection, and appropriate monitoring for resolution of symptoms.

Self Assessment Questions:

Which symptom(s) is descriptive of a Grade 3 hypersensitivity reaction?

- A Rash, flushing urticaria, drug fever
- B: Anaphylaxis
- C: Symptomatic bronchospasm, edema/angioedema, hypotension
- D: Rash, drug fever

A patient is coming in to clinic to receive Cycle 1, Day 1 of paclitaxel. Within two minutes of starting the infusion, the patient experiences flushing and decrease in baseline blood pressure of more

- A Diphenhydramine 50 mg by intravenous push
- B Both diphenhydramine 50 mg and ranitidine 50 mg by intravenous
- C Dexamethasone 10 mg and diphenhydramine 50 mg by intravenous
- D Diphenhydramine 50 mg, ranitidine 50 mg, dexamethasone 10 mg

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-569L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ASSESSMENT OF IMPACT OF A CLINICAL PHARMACIST IN A REPRODUCTIVE ENDOCRINOLOGY PRACTICE ON PROVIDER AND NURSE SATISFACTION

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Purpose: At Northwestern Memorial Hospital, the clinical pharmacist is embedded in the reproductive endocrinology practice. Responsibilities of the pharmacist include medication education and navigating the complex process of specialty medication prior authorization, appeals, financial assistance, and fulfillment. This model may differ from that of other reproductive endocrinology practices who do not have a dedicated clinical pharmacist as a part of the clinic care team. The purpose of this study is to assess the impact of a clinical pharmacist in the Northwestern Fertility and Reproductive Medicine practice on time spent by the practice on facilitating medication-related issues, navigation through the prescription process as well as the impact of a pharmacist on provider and nurse satisfaction. **Methods:** This study will be a survey of providers and clinic staff at Northwestern Memorial Hospital Fertility and Reproductive Medicine to assess the time spent on prior authorizations, providing medication education, and facilitation of medication-related issues. In addition, nurses and providers will be surveyed on their level of satisfaction with the services provided by the pharmacist. Comments will be collected for areas of improvement or expansion of pharmacy services. **Conclusions:** Research in progress. Final results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain the role of a clinical pharmacist in the reproductive endocrinology practice at Northwestern Memorial Hospital

Discuss the impact of a clinical pharmacist on provider and nurse satisfaction.

Self Assessment Questions:

1. Which of the following are potential benefits to incorporating a clinical pharmacist into the care team in a reproductive endocrinology practice?

- A Decreased time spent by clinic staff on completing prior authorization
- B: Personalized medication education for patients
- C: Improved provider and nurse satisfaction
- D: All of the above

2. According to the white paper from the American Medical Association on the standardization of prior authorizations, prior authorizations cost physicians up to what amount annually?

- A \$5 billion
- B \$17 billion
- C \$31 billion
- D \$45 billion

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-895L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ASSESSING MEDICAL STUDENT PERCEPTIONS OF SPECIALTY PHARMACY SERVICES AND MEDICATIONS

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Purpose: The purpose of the study is to assess medical students' perceptions of specialty medications and associated pharmacy services. The impact that specialty pharmacy can have on a provider's practice is growing. Medical students need to have an understanding of the significant role that it will play in their future as prescribers. However, medical students' views regarding specialty pharmacy has not been researched extensively. Therefore, this study will be the first to research how medical students perceive specialty pharmacy. **Methods:** An electronic survey will be administered via an e-mail invitation through a class listserv to medical school students (M1-M4) at colleges of medicine located in Illinois who have approved such action. The survey will be both anonymous and voluntary. Questions to the students will assess general demographic information, confidence with specialty medications and specialty pharmacy services, and desire for education or training regarding specialty medications and services. Additionally, the survey will evaluate medical students' attitudes and perceptions regarding the delivery of clinical services by pharmacists for patients prescribed specialty medications. The responses from collected from the survey will be reported as ordinal data using a 4-point Likert Scale. The data will be analyzed by descriptive statistics. **Results:** Results are Pending. **Conclusions:** Results are Pending.

Learning Objectives:

Describe which medications are considered specialty medications.
Discuss the role of community pharmacists in dispensing specialty medications.

Self Assessment Questions:

Which of the following characteristics are common for specialty medications?

- A: Expensive (>\$600 per month)
- B: Treats rare or complex chronic conditions
- C: Requires close monitoring and assessment of response to therapy
- D: All of the Above

Community pharmacists at specialty pharmacies perform which of the following services:

- A: Assist patients with obtaining financial assistance in order to afford
- B: Reinforce the value of adherence to prescribed medication therapy
- C: Manage the prior authorization approval process with specialty medicine
- D: All of the Above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-745L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

A COMPARISON OF THE SAFETY AND EFFICACY OF FACILITATED INTUBATION AND RAPID SEQUENCE INTUBATION

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Purpose: Rapid sequence intubation (RSI) involves administration of induction agents and neuromuscular blocking agents (NMBA). An alternative method of intubation called facilitated intubation (FI) does not utilize NMBAs. Advantages exist in performing RSI, including blunting physiologic response to laryngoscopy and impairing reflexes to prevent aspiration. Using NMBA comes with risk because protective reflexes are removed, a concern in difficult airways due to potential for "can't intubate, can't ventilate" situations. As a result, some practitioners elect to perform FI, allowing risk for aspiration and laryngospasm. The interest of this study is to compare safety and efficacy of RSI and FI. **Methods:** This study was approved by the Institutional Review Board. The study is a retrospective, single-center chart review evaluating adult patients who underwent intubation for acute respiratory failure or inability to protect the airway at OhioHealth Grant Medical Center between March 2015 and September 2016. The study is examining the safety and efficacy of two types of intubation: RSI and FI. The primary endpoint is to examine the unadjusted incidence of cumulative adverse events (such as more than one intubation attempt, traumatic intubation, aspiration, progression to airway emergency) associated with RSI and FI. Additionally, we will describe the in-hospital mortality, length of stay, service line, provider type, and pharmacist participation. Patient data, including age, gender, weight, and medications administered including doses will be collected via electronic medical records. Literature estimates of overall complication rates associated with intubations are variable, ranging from approximately 13% to 30%. Using a two-sided chi-square test and an alpha of 0.05, the proposed sample size of 500 will result in 80% power to detect a 10% difference in the rate of adverse events, assuming an adverse event rate of 25% in one group and 15% in the other group. **Results:** N/A. **Conclusion:** N/A

Learning Objectives:

Discuss advantages and disadvantages in the utilization of neuromuscular blockade.

List potential adverse events associated with intubation.

Self Assessment Questions:

Which of the following statements is most accurate?

- A: Utilization of NMBA increases the risk for aspiration.
- B: Utilization of NMBA may induce laryngospasm.
- C: Utilization of NMBA impairs cough and gag reflexes.
- D: Utilization of NMBA is intended to make intubation easier for the provider.

Which of the following statements is correct?

- A: "Can't intubate, can't ventilate" situations can occur in patients that require intubation.
- B: Aspiration is an infrequent adverse effect of intubation.
- C: Numerous intubation attempts will not result in harm to the patient.
- D: Traumatic intubations do not occur when NMBA is utilized.

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-344L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF ANTIBIOTIC PRESCRIBING PRACTICES FOR EARLY-ONSET SEPSIS IN THE NEONATAL INTENSIVE CARE UNIT

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Purpose: The appropriate prescribing of antibiotics in the neonatal intensive care unit (NICU) is a current challenge faced by many clinicians. In particular, early-onset sepsis (EOS) can be difficult to diagnose and is often treated when an infection is not confirmed. Given the nonspecific presentation of neonatal sepsis, patients are frequently started on antibiotics early and continued for a prolonged duration. The objective of this study is to evaluate antibiotic prescribing in the NICU for consistency in empiric treatment of EOS with a goal of standardizing practice. **Methods:** Prior to data collection, approval was obtained through the Institutional Review Board. The electronic medical record was used to identify neonates with antibiotic utilization within the first three days of life and neonates not prescribed antibiotics with specific clinical criteria. The criteria included an elevated C-reactive protein, neutropenia, thrombocytopenia, or the need for supplemental oxygen. Patients were excluded if the medication prescribed was ophthalmic erythromycin or antifungal monotherapy. The following data was collected for each patient: gestational age, birth weight, gender, delivery method, presence of chorioamnionitis, timing of rupture of membranes to birth, antibiotics prescribed during hospitalization and duration, culture results and antibiotic susceptibilities, and the presence of a confirmed infection. The following maternal information was also collected if available: maternal group B streptococci (GBS) status, antibiotics administered and duration, and the presence of maternal fever. The primary endpoint of this study is to identify the current prescribing practices for empiric antibiotic treatment of EOS and the correlation with specific labs associated with antibiotic use and confirmed infection. Secondary endpoints include determining compliance with the Centers for Disease Control and Prevention GBS guidelines and assessing subsequent antibiotic courses after receiving antibiotics during the first 72 hours of life. **Results/Conclusions:** Final results and conclusions will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize the most common risk factors associated with early-onset sepsis in neonates.

Describe appropriate treatment options and dosing regimens for early-onset sepsis.

Self Assessment Questions:

A neonate was admitted to the NICU with possible early-onset sepsis. Which of the following findings would be identified as a risk factor?

- A: 2 hours from rupture of membranes to birth
- B: Clear amniotic fluid
- C: Maternal colonization of GBS with ampicillin 2 grams administered
- D: Born at 38 weeks gestation

A 31-week old neonate was born with predisposing risk factors for early-onset sepsis. It is now postnatal day 1. Which of the following is an appropriate empiric treatment and dosing regimen for this

- A: Ampicillin 100 mg/kg every 12 hours + gentamicin 4.5 mg/kg every 12 hours
- B: Ciprofloxacin 10 mg/kg every 12 hours
- C: Gentamicin 5 mg/kg every 48 hours
- D: Metronidazole 7.5 mg/kg every 24 hours

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-329L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

OPTIMIZATION OF CLOSTRIDIUM DIFFICILE TREATMENT UTILIZING PATIENT RISK FACTOR ASSESSMENT AND ANTIMICROBIAL STEWARDSHIP BUNDLE

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Purpose: In 2013, the CDC published a report stating that Clostridium difficile was one of three antibiotic-resistant organisms that was an urgent threat to the United States. These urgent threats have the potential to become widespread, making it necessary to identify infections and reduce transmission of these microbes. A 2015 update published by the CDC found the United States had approximately 500,000 cases of Clostridium difficile infections (CDIs) over a one-year period and 15,000 deaths were estimated to be directly attributable to these infections. It is estimated that C. difficile costs approximately \$4.8 billion each year in acute care facilities alone. Methods to combat the threat of C. difficile include implementation of antimicrobial stewardship programs (ASPs) in hospitals, appropriately treating CDIs, and reducing exposures to CDI risk factors. The purpose of this study is to evaluate the relationship between an ASP's recommendations and compliance with a C. difficile bundle (a set of guideline-based treatment recommendations) for patients with positive toxigenic C. difficile polymerase chain reaction (PCR) in a community hospital. **Methods:** Patients aged 18 years or older with positive toxigenic C. difficile PCR at Munson Medical Center (MMC) were eligible for inclusion in this retrospective, non-randomized, pre-post intervention study. Pregnant females and prisoners were excluded. The primary objective is to compare rates of compliance with bundle elements between pre- and post-implementation of the evidence-based C. difficile bundle. The primary outcome will be defined as composite compliance with the following three bundle elements: appropriate IDSA guideline-based treatment regimen, removal of non-essential concomitant antimicrobials and removal of non-essential acid suppressants. **Results:** Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Select appropriate C. difficile testing modalities for patients based on patient presentation

Identify modifiable C. difficile infection risk factors that are addressable by an antimicrobial stewardship bundle

Self Assessment Questions:

AW is a 55 year old female admitted as an inpatient with community acquired pneumonia. On day 4 of admission, AW develops diarrhea with 3 loose stools in the past 24 hours and has been receiving docus

- A: Glutamate dehydrogenase enzyme immunoassay
- B: Toxin A/B enzyme immunoassay
- C: Toxigenic C. difficile polymerase chain reaction
- D: No testing is indicated at this time

Which of the following is a modifiable C. difficile infection risk factor?

- A: Acid suppressant use
- B: Advanced Age
- C: Intraabdominal surgery
- D: Chemotherapy use

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-436L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION OF A DISCHARGE MEDICATION BEDSIDE DELIVERY PROGRAM IN A COMMUNITY HOSPITAL SETTING

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Purpose: Patients with multiple comorbidities utilizing prescription medications are at high risk for readmission due to the complexity of their medication regimens. The goal of this study will be to increase the number of patients discharging from the hospital with their essential medications. **Methods:** The study was submitted and approved by the Institutional Review Board. Eligible patients include adults (greater than 18 years of age) admitted to the hospitalist service discharged home with new prescriptions or requiring refills of current prescriptions. Pharmacists rounded on the patient population with the interdisciplinary team and offered medication dispensing prior to discharge along with appropriate education. The primary objective of this study is to provide a cohesive transition from hospital to home while increasing accessibility to medications by delivering discharge medications to the bedside. Secondary objectives will be to increase the raw number of prescriptions captured and revenue in the Aspirus Wausau Hospital Clinic Pharmacy, improve HCAHPS scores on medication related questions, reduce 30-day readmission rates during the study period, and address any medication discrepancies that exist. Participation from an interdisciplinary team is necessary to successfully implement this Discharge Medication Bedside Delivery Program at Aspirus Wausau Hospital. **Results/Conclusion:** Study is in progress.

Learning Objectives:

Outline the implementation of a successful discharge medication bedside delivery program.

Recognize challenges in the development and engagement of the interdisciplinary team to improve patient care through adherence to medication regimens upon discharge.

Self Assessment Questions:

Of more than 4 billion prescriptions written in the United States each year, approximately how many are never filled?

- A: 50%
- B: 30%
- C: 22%
- D: 8%

Identify barriers to the implementation of a successful program involving an interdisciplinary team:

- A: Provider resistance due to the inability to provide individual care for
- B: Patient concerns surrounding the issue of transferring prescription
- C: Direct communication between all members of the interdisciplinary
- D: Nurse's unwillingness to add an additional requirement to their health

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-848L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF PHARMACIST-LED REMOTE MEDICATION TITRATION IN AN OUTPATIENT HEART FAILURE POPULATION

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Purpose: ACC/AHA/HFSA clinical practice guidelines recommend specific classes of medications for treatment of heart failure with reduced ejection fraction (HFrEF). Among these are angiotensin-blocking agents (angiotensin receptor-neprilysin inhibitors, angiotensin-converting enzyme inhibitors or angiotensin receptor blockers), -blockers, and aldosterone antagonists. It is recommended to titrate these medications to target (or maximally tolerated) doses to achieve the dose-dependent morbidity and mortality benefits demonstrated in clinical trials. However, studies have consistently shown that target doses recommended in guidelines and those achieved in clinical practice remain disparate. In an attempt to optimize HFrEF medication regimens, Bronson Methodist Hospital formed the remote Pharmacist-Led Heart Failure Medication Titration Clinic under a collaborative practice agreement with Advanced Cardiology. The purpose of this study is to determine the impact of pharmacist interventions on medication optimization in outpatients with HFrEF. **Methods:** This is a retrospective chart review of patients deemed stable by a cardiologist for HFrEF management. Patients were included if they were 18-79 years old with NYHA Class I-III HFrEF and required titration of HFrEF medications. The study group included patients enrolled in the Bronson Pharmacist-Led Heart Failure Medication Titration clinic, whereas the comparator group included patients meeting the same inclusion criteria who were not enrolled. Patients were excluded if they had an uncontrolled rhythm abnormality, documented systolic blood pressure of <100mmHg in the last 6 months, or CKD stage 4-6. The primary outcomes include the number and type of evidence-based therapeutic interventions made by pharmacists compared to standard of care. Secondary outcomes include the percentage of patients whose HFrEF medications are considered optimized, average time to achieve up-titration, reasons for not achieving target doses, adverse effects, and potential reimbursement for medication therapy management services. **Summary/Conclusions:** Data collection and analysis are currently in progress. Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize the importance of pharmacists in a cardiology ambulatory care setting with the goal of optimizing HFrEF medications.

Identify target doses of medications used to treat HFrEF.

Self Assessment Questions:

Which of the following is a benefit of pharmacist-driven titration of HFrEF medications towards target doses?

- A: Increased compliance with CMS requirements
- B: Increased patient survival
- C: Improvement in patient left ventricular function
- D: B and C

Which of the following is an evidence-based target dose of lisinopril for HFrEF management?

- A: 20mg daily
- B: 10mg daily
- C: 5mg daily
- D: 2.5mg daily

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-356L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ASSESSMENT OF PHARMACY TECHNICIAN LEARNING PREFERENCES IN RESPONSE TO TRAINING PROGRAM COMPLETION REQUIREMENT

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Beginning in 2020, the baseline requirements to take the Pharmacy Technician Certification Exam (PTCE) will mandate initial pharmacy technician candidates complete an accredited pharmacy technician education program in order to sit for the exam. No current literature assesses how pharmacy technicians prefer to learn. This project will add critical information regarding preparing pharmacy technicians for the PTCE and information obtained can be widely applied in pharmacy settings. The primary objective is to assess pharmacy technician learning preferences to facilitate success with PTCE. Secondary objectives are: to determine the preferred delivery method of course material and percentage of those who have taken PTCE. For the subset of those taking PTCE, objectives include: identifying self-perceived trouble areas of PTCE and determining any correlations between learning preference and exam pass rate or previous job experience. The VARK (visual, aural, read/write, kinesthetic) questionnaire was incorporated into a larger survey. Participants are asked about learning preferences, previous experiences with PTCE, preparation for PTCE, and demographic information including pharmacy experience. The survey will be distributed during live staff meetings at The Ohio State University Wexner Medical Center and a pharmacy technician continuing education session held by the Ohio Pharmacists Association, between November 2016 and June 2017, to approximately 300 pharmacy technicians across various practice settings. Surveys will be numbered and collected at the end of each meeting. Learning Preferences will be assigned by the VARK data analytics team and descriptive statistics will be used to analyze the remainder of the survey questions. To date, the response rate for the survey is (44/45) 97.8% with final results to follow. The anticipated results will aid in the development of an ASHP/ACPE accredited pharmacy technician training program with a curriculum that is tailored to the learning preferences of the students.

Learning Objectives:

Review the updated requirements for the Pharmacy Technician Certification Board Exam

Explain the visual, aural, read/write, and kinesthetic (VARK) learning preferences

Self Assessment Questions:

Which of the following statements is correct regarding the VARK Questionnaire?

- A VARK refers to learning and communication preferences.
- B: Learning preferences are hardwired at birth.
- C: A learner will not have multiple preferences.
- D: There are 3 possible learning preference assignments.

In which year will the requirements for the Pharmacy Technician Certification Board (PTCB) Exam change?

- A 2017
- B 2018
- C 2019
- D 2020

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-774L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION OF A PHARMACIST-DRIVEN, EMERGENCY DEPARTMENT URINE CULTURE REVIEW IN A COMMUNITY HOSPITAL

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Purpose: Emergency department (ED) pharmacists are in a position to directly impact care and clinical practice in a variety of ways, not the least of which is antimicrobial stewardship. With knowledge of evidence-based regimens, drug interactions, and formulary options as well as the ability to collaborate with patients and healthcare providers, pharmacists are equipped to proactively impact antimicrobial use through antimicrobial stewardship. Previous studies justify the utilization of pharmacists in this way citing benefits to the health system including: decreased ED visits, 30-day readmission rates, and improved resource utilization. On a larger scale, improved ED antimicrobial use in the ED through pharmacist intervention can minimize resistance development, the ultimate goal of antimicrobial stewardship. The primary objective of this study is to compare and contrast readmission rates, process time, and antibiotic appropriateness between a nursing-driven and pharmacist driven process. Methods: A retrospective case-control study with Institutional Review Board approval is planned comparing pre- and post-implementation of a pharmacist-led emergency department microbial culture review process. Eligible patient will be identified through an a computerized decision-support program which will include patients from June 1, 2016 through August 31, 2016 and September 1, 2016 through November 31, 2016 for the pre- and post-implementation groups, respectively. Included patients will have been treated in the study hospitals ED and had a urine culture drawn that resulted positive in the study timeframe. Excluded patients were those who were admitted inpatient or observation; those less than 18 years of age or greater than 89 years of age; and those with protected status. Data from the two study groups will be compared to identify differences in readmission rates, process time, and antibiotic appropriateness. Preliminary Results and Conclusion: Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify strategies for pharmacists to improve antibiotic use in the emergency department setting with consideration of the CDC Core Elements of Hospital Antibiotic Stewardship Programs.

Recall evidence-based recommendations and patient specific information to select an appropriate treatment regimen for the empiric treatment of an uncomplicated UTI.

Self Assessment Questions:

Which of the following strategies may an emergency room pharmacist utilize to improve antibiotic prescribing?

- A Discourage use of antibiotics in cases where bacterial infection is
- B: Optimize dose and duration of therapy for indication and patient ct
- C: Provide personalized education to providers on prescribing habits
- D: All of the above are true

A 62 yo woman presents to the emergency department with complaints of dysuria and urinary frequency for the past 3 days. She admits to having occasional urinary tract infections in the past, most recent

- A Bactrim 1 DS tablet PO BID x 3 days
- B Bactrim 1 DS tablet PO BID x 7 days
- C Nitrofurantoin 100 mg PO BID x 5 days
- D Nitrofurantoin 100 mg PO BID x 7 days

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-590L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PATIENT SATISFACTION USING A PATCH DELIVERY DEVICE VERSUS SYRINGE INJECTION FOR PEGFILGRASTIM ADMINISTRATION

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Purpose: To compare patient satisfaction and readmission rates in patients using the patch delivery device vs syringe injection of pegfilgrastim in a community hospital setting. **Background:** Pegfilgrastim is a human granulocyte colony-stimulating factor (G-CSF) which regulates neutrophil production, progenitor proliferation, and differentiation. Pegfilgrastim should be administered no sooner than 24 hours after chemotherapy which requires a follow-up visit for the syringe injection. A relatively new patch delivery device can be applied during the initial chemotherapy infusion visit and is designed to administer pegfilgrastim approximately 27 hours after application. The device may increase compliance of pegfilgrastim administration which may potentially reduce readmission rates and costs associated with noncompliance while improving patient quality of life measures. **Methods:** Any English speaking patient over the age of 18 receiving pegfilgrastim in a community hospital outpatient setting was enrolled in the study. Patients received the syringe injection of pegfilgrastim the day following the initial chemotherapy infusion in order to evaluate hypersensitivity reactions, then received the pegfilgrastim patch delivery device after the following chemotherapy infusion. The patient received a 12 question survey on a subsequent visit in order to evaluate patient satisfaction, patient preference, and potential hospital readmissions within 14 days of pegfilgrastim administration. **Preliminary results:** Preliminary data suggests that patch delivery device use is preferred by patients for its convenience but may lead to increased non-compliance. Additional data is still being collected and will be presented at the conference. **Conclusions:** Preliminary data suggests that institutional reimbursement issues present a significant barrier to patch delivery device utilization. While patients preferred the convenience of the patch delivery device, faulty adherence to the patient increases noncompliance of the patient actually receiving the medication. Although, patients failed to receive their pegfilgrastim after failed patch delivery device administration, 14-day readmission rates did not increase as a result.

Learning Objectives:

Indicate appropriate pegfilgrastim indications for use and administration parameters

Define febrile neutropenia and identify risks, benefits, and barriers to utilizing the patch delivery device

Self Assessment Questions:

Pegfilgrastim should be administered:

- A At least 27 hours prior to chemotherapy infusion.
- B: At least 24 hours prior to chemotherapy infusion.
- C: At least 24 hours after chemotherapy infusion.
- D: At least 27 hours after chemotherapy infusion.

Febrile neutropenia is defined as:

- A A single temperature > 39.3C orally or > 39C over 1 hour with an /
- B A single temperature > 38.3C orally or > 38C over 1 hour with an /
- C A single temperature > 38.3C orally or > 38C over 1 hour with an /
- D A single temperature > 39.3C orally or > 39C over 1 hour with an /

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-419L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF WARFARIN DOSING ON SHORT-TERM BLEEDING EVENTS IN LEFT-VENTRICULAR ASSIST DEVICE PATIENTS

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Purpose: Limited data exist to describe peri-operative warfarin dosing in left ventricular assist device (LVAD) patients and its associated clinical outcomes. Given the paucity of data, significant variability in dosing strategies to mitigate the risks of thrombotic and bleeding events is observed. The objective of this study is to compare the incidence of peri-operative bleeding events between LVAD patients who achieved a therapeutic International Normalized Ratio (INR) in less than or equal to 7 days versus greater than 7 days. **Methods:** This is a retrospective review of adult patients admitted to Spectrum Health Butterworth Hospital for LVAD implantation from January 1st, 2011 to July 30th, 2016. A minimum of 51 patients were required in each arm to meet 80% power and detect a 33% difference in bleeding events between the two comparator groups. Data collected includes: baseline demographics, type of LVAD, history of bleeding or thrombotic event, anticoagulation therapy prior to LVAD implantation, and relevant pre-and post-operative laboratory values. Intraoperative data to be collected includes surgical technique, need for cardiopulmonary bypass, and blood product utilization. Post-operative coagulation data, including heparin and/or aspirin use, timing of warfarin initiation, and time to therapeutic INR (in days) also were collected. The primary outcome will compare the incidence of major or minor bleeding events between the two aforementioned groups according to the Interagency Registry for Mechanically Assisted Circulatory Support (INTERMACS) definitions. Secondary outcomes measured include incidence of pump thrombosis, ICU length of stay, hospital length of stay, and in-hospital mortality.

Results and Conclusions: Data collection and analysis is ongoing with an estimated number of patients of 100. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain differences in types of LVADs and select the best LVAD to use based on patient specific characteristics.

Discuss literature surrounding thrombotic and bleeding events in post-operative LVAD patients

Self Assessment Questions:

Which of the following is an advantage of implementing a HeartWare device over a HeartMate II device?

- A Fewer incidences of gastrointestinal bleeding
- B: Fewer incidences of ischemic stroke
- C: Fewer incidences of renal dysfunction
- D: Lower mortality risk

Which of the following is not an indication for LVAD implantation?

- A Bridge to decision
- B Destination therapy
- C End of life therapy
- D Bridge to transplant

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-631L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

COMPARISON OF NICARDIPINE TO CLEVIDIPINE IN THE MANAGEMENT OF HYPERTENSION IN ACUTE STROKE

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Purpose: In the acute stage of stroke, elevated blood pressure is associated with worsened clinical outcomes including but not limited to rebleeding, hemorrhagic conversion, cerebral edema, and neurogenic pulmonary edema. Currently the American Heart Association/American Stroke Association Guidelines for the Management of Spontaneous ICH do not recommend a preferred agent for intensive blood pressure control in patient who have experienced an acute stroke including intracranial hemorrhage, acute ischemic stroke, and subarachnoid hemorrhage. The purpose of this study is to compare the efficacy and safety of nicardipine and clevidipine for the treatment of hypertension in patients with an acute stroke. **Methods:** This is a retrospective cross-sectional chart review comparing adults treated with nicardipine or clevidipine for blood pressure control in patients with acute stroke from 3/17/2015 to 9/30/2016. Acute stroke was defined as a rapidly developing signs of neurological dysfunction due to hemorrhagic or ischemic brain infarct. Both ischemic and hemorrhagic stroke types were evaluated. Patients were excluded if they were under 18 years, had traumatic brain injury, intracranial neoplasm, or were on dialysis, all other patients were included. Therapeutic efficacy was measured by time to goal blood pressure, percent time spent in goal, maximum and minimum blood pressure, blood pressure range, and need for additional antihypertensive agents during the infusion. Clinical outcomes compared were a composite of in-hospital death, 30 day readmission, rebleeding, ischemic to hemorrhagic conversion, and hematoma expansion. Other clinical outcomes included length of ICU and hospital stay, hypotension, bradycardia, tachycardia, onset of atrial fibrillation, and onset of acute kidney injury. **Data/Conclusions:** Data collection and analysis are pending. Conclusions will be drawn with final statistical analysis of results and presented at the Great Lakes Pharmacy Residency conference.

Learning Objectives:

Review guideline recommendations for blood pressure management in acute stroke.

Recognize differences between nicardipine and clevidipine and how this may affect blood pressure control during acute stroke

Self Assessment Questions:

The 2015 AHA/AHA Guideline for the Management of Spontaneous ICH recommends an acute lowering of systolic blood pressure to 140 mmHg. The guideline mentions that evidence may support lowering blood pressure to:

- A: <120 mmHg
- B: 120 to 140 mmHg
- C: <130 mmHg
- D: <140 mmHg

One of the main advantages of clevidipine as compared to nicardipine in treating acute blood pressure elevations is:

- A: Cost
- B: Adverse Effects
- C: Duration of action
- D: Onset of action

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-661L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF RADIUM-223 EFFECT ON PAIN AND TOXICITY IN PATIENTS WITH METASTATIC CASTRATE-RESISTANT PROSTATE CANCER

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Metastatic prostate cancer is considered incurable, and treatments are focused on prolonging overall survival and improving quality of life. Androgen deprivation therapy (ADT) is the backbone of treating metastatic disease. Despite receiving ADT, almost all patients progress to castrate-resistant prostate cancer (CRPC), a diagnosis with a median survival of approximately 18 months. Treatment options for CRPC were limited until recently with the approval of several novel medications. Abiraterone acetate and enzalutamide are oral medications approved for patients with CRPC that were shown to improve overall survival and progression-free survival when compared to placebo. Recently, radium-223, a first-in-class alpha particle-emitting radiotherapy that delivers radiation directly to bone metastases, was shown to improve overall survival for CRPC patients compared to placebo. Radium-223 also improved time to first skeletal-related event, but its impact on pain control is unknown. Despite limited safety and toxicity data, radium-223 has been used in combination with either abiraterone acetate or enzalutamide in clinical practice due to differing mechanisms of action and the lack of overlapping side effects. The primary objective of this project is to identify the impact of radium-223 on pain control and determine the analgesic requirements of patients with CRPC receiving radium-223. The secondary objective is to describe institutional experience of patients tolerability to combination therapy. A retrospective chart review was performed on all patients who received at least one dose of radium-223 between May 1, 2013 and August 31, 2016. Analgesic medication usage and pain scores were collected for all patients who received radium-223, whether as monotherapy or in combination therapy, and will be analyzed to determine analgesic usage trends. For the secondary objective, graded toxicity assessments were collected at each clinic visit prior to radium-223 administration and will be analyzed to determine the tolerability of combination therapy. The results of this project are pending.

Learning Objectives:

Describe the efficacy and safety outcomes of radium-223 therapy in patients with castrate-resistant prostate cancer.

Discuss the tolerability of radium-223 therapy in patients with castrate-resistant prostate cancer

Self Assessment Questions:

Which of the following is true regarding radium-223 therapy?

- A: Radium-223 decreased the time to first skeletal-related event.
- B: Radium-223 improves progression-free survival.
- C: Radium-223 improves overall survival compared to placebo.
- D: Radium-223 has a broad adverse event profile due to the targeted

Which of the following is true regarding radium-223 therapy?

- A: Radium-223 therapy resulted in increased rates of grade 3 or 4 neutropenia
- B: Radium-223 therapy resulted in increased rates of grade 3 or 4 an
- C: Radium-223 therapy resulted in increased rates of grade 3 or 4 fat
- D: Radium-223 therapy resulted in no clinically significant differences

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-655L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ASSESSMENT AND UTILITY OF AN ELECTRONIC PAIN QUESTIONNAIRE IN A CHRONIC PAIN POPULATION

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Purpose: Given the gaps in consistent electronic data capture for chronic pain, it is difficult for physicians to systematically assess and monitor patients with chronic painful conditions. This study aims to determine the value of a validated electronic pain questionnaire to healthcare professionals involved in the management of chronic pain in the ambulatory care setting. **Methods:** This study will use a cross-sectional design that will employ a 17-question electronic chronic pain assessment tool at an ambulatory care clinic. Patients will be identified based on chronic pain diagnosis or indicated as a candidate by their provider. Patients will use an iPad application to access the survey and respond appropriately to the prompted questions. The survey results will be sent real-time to the investigator and given to the provider to aid in clinical decision making. Each patient will be asked to complete this survey at least twice within the 6 month time frame of the study to be included in analysis. One-on-one interviews with physicians, medical assistants, health coaches, and pharmacists will be utilized to determine the usefulness of this survey in practice. The results from the interviews will be grouped by themes to assess for similarities and differences in the responses. Patient survey responses will also be analyzed to characterize the population demographics, the intensity, location and type of pain, changes in pain intensity over time as well as interference with function, sleep, and mood. **Results/ Conclusions:** Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe an area of chronic pain management in which physicians lack resources to assess pain.

Identify additional areas of a patient's life that can be affected by chronic pain.

Self Assessment Questions:

The electronic chronic pain questionnaire (eCPQ) was created to address which difficulty in assessing chronic pain?

- A: Growing opioid overdose epidemic
- B: Lack of electronic data of patient's pain
- C: Inconsistent diagnosis of pain source
- D: Limited availability of pain medications

Which chronic pain sequelae can be assessed using the electronic chronic pain questionnaire?

- A: Function
- B: Sleep
- C: Mood
- D: All of the above

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-392L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

SEPSIS EVALUATION FOLLOWING CENTRAL LINE DISCONTINUATION IN THE NEONATAL INTENSIVE CARE UNIT

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Central line placement is a well-described risk factor for the development of sepsis in neonates. There is an increased risk of sepsis within 72 hours following central line removal. Different strategies to combat the risk of line infections have been utilized, including the administration of prophylactic antibiotics at the time of removal. The purposes of this study are to describe the incidence of sepsis and its evaluation in neonates following central line removal and to determine the risk factors associated with central line infection before potential implementation of prophylactic antibiotic guideline in our neonatal intensive care unit (NICU). This is a retrospective electronic chart review of neonates with central lines from June 2013 to August 2016. Neonates who died while the central line is in place, are transferred, or received antibiotics more than 24 hours after line discontinuation will be excluded. The number of neonates with sepsis and sepsis evaluation performed will be measured by examining the use of antibiotics up to 72 hours from line removal. Sepsis evaluation labs including cultures and complete histories of central lines will be recorded. Comorbidities and known risk factors of sepsis (necrotizing enterocolitis, surgical interventions, prior antibiotic exposure, patient demographics, and parenteral nutrition) will be assessed. Lastly, length of hospitalization and mortality will be examined. During the study period, approximately 350 patients had a central line. Preliminary analysis was performed in 11 patients with 33 central line encounters. Median gestational age was 29 weeks (range 25 - 37) and birth weight was 1060 gram (range 600 - 3864). In 33 encounters, 1 (3%) sepsis evaluation was performed within 72 hours of central line discontinuation. This patient received antibiotics for 48 hours. Preliminary findings point to a lower than previously published rate of sepsis following line discontinuation in our NICU. Data collection is ongoing.

Learning Objectives:

Describe the incidence of sepsis and the evaluation for sepsis in neonates following central line removal in the NICU.

Describe the risk factors associated with sepsis and the evaluation for sepsis following central line removal in the NICU.

Self Assessment Questions:

What is the incidence of sepsis in neonates following central line removal?

- A: 15% for very low birthweight infants
- B: 36% for very low birthweight infants
- C: 64% for very low birthweight infants
- D: 92% for very low birthweight infants

Which of the following is/are risk factor(s) for central line infection in a neonate?

- A: Male gender
- B: Prolonged central line placement
- C: Low birthweight
- D: B and C

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-674L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

AN EVALUATION OF THE INCIDENCE OF URINARY TRACT INFECTIONS IN RENAL TRANSPLANT RECIPIENTS RECEIVING TRIMETHOPRIM/SULFAMETHOXAZOLE PROPHYLAXIS VERSUS ATOVAQUONE PROPHYLAXIS FOR PNEUMOCYSTIS JIROVECI PNEUMONIA (PCP)

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Purpose: Urinary tract infections (UTI) are among the most common bacterial infections in the renal transplant population. Standard therapy for the prevention of another infectious complication of transplantation, *Pneumocystis jirovecii* pneumonia (PCP), may provide protection against the development of UTIs in the post-renal transplant patient. Trimethoprim-sulfamethoxazole (TMP/SMZ) has been identified as the agent-of-choice for PCP prophylaxis, with atovaquone recognized as a preferred alternative. The current institution utilizes single-strength TMP/SMZ daily for 12 months post-transplant as first-line prophylaxis for PCP in kidney transplant recipients. In the setting of sulfa allergy or intolerance to TMP/SMZ, atovaquone is utilized as the alternative agent for PCP prevention, along with ciprofloxacin while the urinary stent is in place. TMP/SMZ has been found to reduce UTI rates; however, as atovaquone has no antibacterial activity, its impact on the prevention of UTIs compared to TMP/SMZ is not known. The objective of this study is to determine the incidence of UTI within one year post-transplant in kidney transplant recipients on TMP/SMZ prophylaxis compared to those on atovaquone prophylaxis for PCP. **Methods:** This retrospective cohort study will be conducted utilizing the electronic health record to identify renal transplant recipients 18 years of age or older who received a renal transplant at Northwestern Memorial Hospital between January 1, 2010 to January 1, 2016. Patients who were started on either TMP/SMZ or atovaquone for PCP prophylaxis and continued for one year post-transplant will be included. Patients will be excluded if they received a prior transplant or a combined organ transplant. Study endpoints include incidence of UTI within one year post-transplant, time to UTI diagnosis, type of bacterial pathogen, and rate of bacterial resistance to TMP/SMZ and ciprofloxacin. **Results:** Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the rationale for use of trimethoprim-sulfamethoxazole and atovaquone for infection prophylaxis post-renal transplant.

Define common adverse events associated with trimethoprim-sulfamethoxazole and atovaquone.

Self Assessment Questions:

Which of the following is recognized as the preferred agent for prophylaxis of *Pneumocystis jirovecii* pneumonia?

- A: Ciprofloxacin
- B: Atovaquone
- C: Trimethoprim-sulfamethoxazole
- D: Nitrofurantoin

Which of the following is a common adverse effect of trimethoprim-sulfamethoxazole frequently encountered in the transplant population?

- A: Lower extremity edema
- B: Leukopenia
- C: Hypokalemia
- D: Hyperglycemia

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-539L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF ANTIBIOTIC PRESCRIBING FOR ACUTE BRONCHITIS IN OUTPATIENT SETTINGS AT A VETERAN AFFAIRS HOSPITAL

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Purpose: The overuse and misuse of antibiotics plays a major role in the emergence of antibiotic resistance and the decreased effectiveness of treatments for bacterial infections. The majority of antibiotic prescribing occurs in the outpatient setting, making this area an essential target for stewardship initiatives. Bronchitis is commonly managed in outpatient settings. Given that it is primarily a viral infection, current guidelines do not recommend antibiotic therapy. Despite this, patients presenting with bronchitis are often treated with antibiotics. As a result, a national goal has been established to reduce outpatient antibiotic use for bronchitis by 100% by 2020. Therefore, the purpose of this study is to evaluate antibiotic prescribing during outpatient clinic and emergency department visits for acute bronchitis at our institution, as well as to identify outpatient settings that would benefit from implementation of a stewardship initiative to improve antibiotic prescribing practices. **Methods:** This is an observational study among patients who were diagnosed with acute bronchitis at our institution between January 2016 and December 2016. The primary endpoint is to determine the proportion of visits in which an antibiotic was prescribed for the treatment of bronchitis among all outpatient visits for which acute bronchitis was the primary diagnosis. Outpatient visits associated with a selection of ICD-10 diagnosis codes for acute bronchitis are included. Secondary endpoints include antibiotic selection, days supply, number of refills allowed, prescriber specialty, and location of visit. Descriptive statistics will be used to describe the proportion of visits in which an antibiotic was prescribed, and independent t-test and Chi square analysis will be used to describe provider characteristics. Significance will be considered for $P < 0.05$. **Results/Conclusions:** Data collection and analysis is ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the impact of inappropriate antibiotic use

Review current guideline recommendations for the management of acute bronchitis

Self Assessment Questions:

Which of the following is associated with inappropriate antibiotic use?

- A: Decreased health care costs
- B: Decreased prevalence of antibiotic-resistant bacteria
- C: Unnecessary adverse drug reactions
- D: Decreased incidence of *Clostridium difficile* infection

Which of the following antibiotics is appropriate for the treatment of uncomplicated acute bronchitis?

- A: Levofloxacin
- B: Cephalexin
- C: Azithromycin
- D: None of the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-450L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EFFICIENCY ANALYSIS OF A REAL-TIME MEDICATION DELIVERY TRACKING SYSTEM WITHIN AN ACADEMIC HEALTH CENTER

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Background: Operational efficiency is one of the cornerstones of a high performing pharmacy. Hospital pharmacy departments face significant operational pressure to meet the existing challenges associated with achieving control of the medication distribution process by increasing efficiency and decreasing excess cost. Weaknesses of health-system pharmacy drug distribution include missing medication communications, lost medication deliveries, re-dispensed doses, and increased labor costs of pharmacy personnel, drug cost, and overall strain on interdepartmental relationships relying on timely medication delivery.

Purpose: The purpose of this project is to implement a barcode enabled dose-tracking system and evaluate the impact on transparency of drug delivery, number of missing medications, and pharmacy re-work and waste. This will be achieved by evaluating the efficiency of current workflows for patient-specific preparations, designing and implementing a barcode-enabled medication tracking system, and measuring the impact of implementation. **Methods:** A multidisciplinary project workgroup is being led to design and implement the medication tracking system. Process maps for dispense tracking workflow will be designed and the features of the dispense-tracking technology will be analyzed. The impact of number of missing medication requests, number of re-dispensed doses, cost associated with re-dispensed doses, medication-turnaround time, and staff satisfaction will be measured. Expected results of implementation include achieving remote visibility of medication delivery and savings in labor and drug cost. Future directions for house-wide implementation of a medication-dose tracking system will be detailed in a report through the results of this project. **Results & conclusions:** To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review the advantages of medication dose tracking technology
State the metrics that should be monitored when implementing a medication tracking system

Self Assessment Questions:

Which of the following is a benefit gained by implementing medication dose tracking technology?

- A Ensures confirmation of medication delivery
- B Reduces time consumed locating missing medication requests
- C Enhances bidirectional communication with nursing staff
- D All of the above

Which of the following metrics can be used to evaluate the performance of a medication dose tracking system?

- A Number of missing medication requests
- B Time spent to resolve missing medication requests
- C Number of re-dispensed doses
- D All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-960L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

COMPARISON OF CONTINUOUS INFUSION OF OCTREOTIDE VS INTERMITTENT SUBCUTANEOUS OCTREOTIDE FOR THE TREATMENT OF HEPATORENAL SYNDROME

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Purpose: Hepatorenal syndrome (HRS) is progressive renal failure in the absence of renal pathology. HRS is a frequent complication seen in patients with advanced cirrhosis and liver failure. Renal insufficiency develops secondary to extreme splanchnic vasodilation and compensatory renal vasoconstriction. The syndrome carries a poor prognosis, but orthotopic liver transplantation (OLT) has been accepted as a potentially life-saving modality. Several studies have evaluated the use of vasoconstrictors in this patient population. The combination of midodrine, an α -adrenergic agonist, and octreotide, a non-specific inhibitor of endogenous vasodilators has been used with varying success, mainly as a bridge to OLT. While octreotide is recommended in the AASLD guidelines for the management of HRS, there is limited evidence addressing the most appropriate route of administration. The purpose of this study is to evaluate the efficacy of intermittent subcutaneous octreotide versus continuous infusion of intravenous octreotide in patients with HRS. **Methods:** A retrospective chart review was conducted from July 2010 to June 2016. All patients at least 18 years of age with a diagnosis of HRS treated with octreotide were included. Patients were excluded if they were pregnant, lactating, or had a diagnosis of renal insufficiency that was not due to HRS. The primary outcome was resolution of renal dysfunction. Complete resolution was defined as improvement in serum creatinine (SCr) to a level less than 1.5mg/dl or ability to discontinue renal replacement therapy (RRT) as treatment for HRS; partial resolution was defined as a 50% decrease in SCr to a value greater than 1.5 mg/dL for patients that did not require RRT. Secondary endpoints included 30 day mortality, changes in MAP and HR from baseline to day 5 and day 30, average length of stay in the intensive care unit (ICU) and average hospital length of stay. **Results:**

Results are pending. Conclusion: Conclusions are pending statistical analysis.

Learning Objectives:

Discuss traditional hepatorenal syndrome management and its impact on mortality.

Identify the relationship between duration of renal replacement therapy and the resolution of renal function post-transplant.

Self Assessment Questions:

1 Approaches for management of hepatorenal syndrome (HRS) include:

- A Albumin infusions for volume expansion with concurrent use of vasopressors
- B Angiotensin converting enzyme inhibitors can be used for treatment
- C Non-dihydropyridine calcium channel blockers can be used for treatment
- D Renal replacement therapy (RRT) can be considered as a bridge to transplant

Which of the following is true regarding octreotide:

- A Octreotide administered intravenously results in increased bioavailability
- B Octreotide mimics natural somatostatin by inhibiting serotonin release
- C When given in combination with midodrine, octreotide decreases total peripheral resistance
- D B & C

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-579L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATING NEXT-GENERATION SEQUENCING FOR PATHOGEN DETECTION IN MENINGITIS AND ENCEPHALITIS, AND IMPLICATIONS FOR ANTIMICROBIAL MANAGEMENT

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Purpose: To investigate the utility of next-generation sequencing (NGS) for the diagnosis of meningitis and encephalitis by utilizing cerebrospinal fluid (CSF) samples from patients with suspected meningitis or encephalitis. To determine the sensitivity and specificity of NGS compared to traditional methods of diagnosis, including culture, polymerase chain reaction (PCR) testing, and antigen testing. The second goal of the proposed research is to determine whether the medical management and/or outcomes of patients could have been altered by the results of NGS, if they had been obtained in real time. In addition, we will characterize the number of patients who experienced death or neurologic sequelae due to an organism that was not identified by traditional microbiologic methods but could have been treated if it was identified in real time by NGS. **Methods:** This is a single center observational comparative study. NGS will be retrospectively performed on approximately 500 residual CSF samples from patients with suspected meningitis or encephalitis in order to evaluate the sensitivity and specificity of NGS compared to traditional diagnostic methods. Confirmatory testing through real-time PCR will be performed for patients with negative results by traditional methods and positive results by NGS. In addition, we will determine whether the results of NGS could have altered antimicrobial therapy and influenced clinical outcomes if it was performed in real time. Secondary outcomes to be evaluated will include time to optimal therapy, antibiotic utilization past 48 hours, as well as microbiologic resource utilization and cost. **Results:** Data collection is ongoing. **Conclusion:** Data collection is ongoing.

Learning Objectives:

Describe current diagnostic methods of meningitis and encephalitis, and the limitations of these methods

Recognize current uses of next-generation sequencing, and opportunities for further use of this technology

Self Assessment Questions:

Which of the following is a reason to improve the diagnosis of meningitis and encephalitis?

- A Low culture positivity rate
- B Multiple separate diagnostic tests may need to be ordered
- C These infections result in significant morbidity and mortality
- D All of the above

Which of the following is true regarding next-generation sequencing?

- A It is inferior to traditional infectious diseases diagnostic methods
- B May have a role to detect organisms not easily identified by traditional methods
- C It is currently utilized in real-time for infectious diseases diagnostic
- D It has not been fully developed for utilization in foodborne illness

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-632L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATING THE COST BENEFIT OF IMPLEMENTING EXTENDED INFUSION OF CEFEPIME WITHIN A 350-BED URBAN COMMUNITY TEACHING HOSPITAL.

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Purpose: Alternative dosing strategies have been employed by antimicrobial stewardship programs to combat escalating resistance patterns. One such example is extended infusion of beta-lactam antibiotics to provide optimal time-dependent killing. Prolonged infusions of these antibiotics have been shown to maximize likelihood of antibiotic concentrations above the minimum inhibitory concentration of the pathogen, resulting in enhanced clinical outcomes and cost savings. The objective of this study will be to evaluate the cost benefit after implementation of cefepime as an extended four-hour infusion in comparison to the standard 30-minute infusion at the same interval.

Methods: Monthly utilization reports will be generated three months prior to and after implementation of extended infusion cefepime. A retrospective chart review will be conducted for patients on cefepime. Data to be collected from electronic health record include indication of use, number of doses administered and duration of therapy, infusion time, and culture results. A standard wholesale acquisition cost will be used to calculate total cost of cefepime one gram and two grams vials. Total drug expenditures will be compared between pre and post implementation of extended infusion cefepime. **Results/Conclusions:** Data collection and analysis is in progress. Results and conclusion will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Outline the benefits of using extended infusion antibiotics.

Identify potential challenges associated with implementing an extended infusion policy.

Self Assessment Questions:

Which of the following are benefits of using extended interval antibiotic administration?

- A Maximize likelihood of antibiotic concentration above minimum inhibitory concentration
- B Enhance (provide optimal) time-dependent pathogen killing
- C Minimize likelihood of drug toxicities by eliminating peak/trough effect
- D All of the above

Which of the following can be potential barriers to implementing extended infusion antibiotic regimens?

- A Reprogramming of infusion equipment
- B Targeted education to all nurses, pharmacists and physicians
- C Variation in dosing and administration duration in supporting literature
- D All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-754L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

RELATIONSHIP BETWEEN THE MAGNITUDE OF HYPERGLYCEMIA AND THE INCIDENCE OF ANTIMICROBIAL RESISTANCE IN PATIENTS WITH URINARY PATHOGENS

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Purpose: Antibiotic resistance is a global concern and diabetic patients are at a heightened risk due to increased antibiotic use for frequent infections. The purpose of this study is to describe the relationship between the magnitude of hyperglycemia and the extent of antimicrobial resistance in urinary pathogens. **Methods:** A multi-center, retrospective study will be completed on hospitalized patients identified with a urinary tract infection (UTI) and diabetes mellitus using ICD-10 codes. Patients 18 years and older that received treatment for a UTI with susceptibility data will be included. Subjects will be excluded if their glycated hemoglobin (HbA1c) was obtained more than 90 days prior to admission. Glycemic control will be evaluated using HbA1c, glucosuria, and glucose control during hospitalization. Data was also collected on comorbidities, length of stay (LOS), corresponding urinalysis, albumin, antibiotic use, previous hospitalizations, and recent surgery history. Categorical resistance (multi-drug resistant, extended-spectrum beta-lactamase (ESBL)-producing, methicillin-resistant *Staphylococcus aureus*, etc.) will be associated to patient factors using logistic regression. **Preliminary Results:** Data was collected on 203 patients with a positive urine culture. *Escherichia coli* was most commonly observed (43%) followed by *Klebsiella pneumoniae* (19%), *Enterococcus faecalis* (9%), and *Proteus mirabilis* (7%). Among *E. coli* and *K. pneumoniae* isolates, 22% and 32% were ESBL-producing organisms, respectively. Median HbA1c was 6.7% (interquartile range, 6.0-8.1%). Thus far, average LOS was 12.6 days and, in the 90 days prior to admission, 42% and 58% of subjects used antibiotics and were hospitalized, respectively. **Conclusions:** Patients with diabetes mellitus are at an increased risk for drug-resistant pathogens. Preliminary data demonstrates a high percentage of ESBL-producing organisms as well as frequent antibiotic use and recent hospitalizations in this population. The relationship of the magnitude of hyperglycemia and presence of antibiotic resistance will be elucidated.

Learning Objectives:

Discuss the global impact of increased antimicrobial resistance

Describe risk factors associated with the development of drug resistant pathogens

Self Assessment Questions:

Which of the following is a consequence of increased antimicrobial resistance?

- A Reduced effective treatment strategies
- B Improved clinical outcomes
- C Reduced healthcare costs
- D Decreased need for new drug development

Which of the following contributes to antibiotic resistance?

- A Appropriate antibiotic prescribing
- B Frequent bacterial infections
- C Antimicrobial stewardship
- D Proper hand hygiene

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-756L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION AND EVALUATION OF SHARED VALUE-BASED CLINICAL DECISION TOOLS IN ONCOLOGY PRACTICE

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Purpose: Cancer treatment costs in the United States are rising. Evidence suggests that increased costs do not correlate with improved outcomes. Organizations have developed tools to evaluate cancer treatment value. The purpose of this project is to develop and implement a value assessment tool at UW Health to assist clinicians and patients in making safe, cost-effective, and shared treatment decisions. **Methods:** The tool incorporates the National Comprehensive Cancer Network (NCCN) Evidence Blocks, the American Society of Clinical Oncology (ASCO) Value Assessment tool, and a cost-per-outcome analysis to estimate the value of treatment. Cost-per-outcome analysis is based on clinical trial results for each of the selected treatment regimens. A sensitivity analysis will be performed on the cost analysis to account for variability within clinical trials and drug cost. The UW Health tool will be piloted in a population of advanced or metastatic non-small cell lung cancer (NSCLC) patients through creation of an algorithm that identifies the treatment with the best value. Value determination is transparent throughout treatment. **Preliminary Results:** A value-based treatment algorithm for advanced or metastatic NSCLC has been developed. Acceptance of the value assessment tool will be evaluated through retrospective chart review of eligible patients. Data to be collected include baseline demographic information, disease staging, treatment recommended per algorithm, treatment chosen by provider, and justification for deviation from the algorithm. Participating providers will be surveyed to determine the usefulness of the tool in treatment decision-making. The value tool will be incorporated into a submission form when requesting new standard regimens. Results of the value assessment will be collected and stored in a shared database. **Conclusions:** Data analysis and results are pending. The approach under development at UW Health will create a transparent, standardized process for value determination that will increase understanding and use of the most cost-effective agents.

Learning Objectives:

Explain the importance of value assessment in cancer care

Describe appropriate components to include in a value determination tool

Self Assessment Questions:

Which of the following has been identified as a reason to include value assessment in cancer care?

- A Cancer treatment costs are stagnant
- B Patients experience "financial toxicity" during cancer treatment
- C Increased costs are correlated with improved outcomes
- D Treatment options for a particular disease state have widely differed

In addition to incremental cost, value determination should include

- A Efficacy of agent as reported in clinical trials
- B Bias inherent in study
- C Toxicities in trial
- D A and C only

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-594L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

CREATION OF AN INTRAVENOUS VANCOMYCIN NOMOGRAM UTILIZING POPULATION PHARMACOKINETICS AT ST. JOHN HOSPITAL AND MEDICAL CENTER

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Purpose: In 2014, a retrospective cohort study was conducted to evaluate methods of obtaining of target vancomycin troughs at St. John Hospital and Medical Center (SJHMC). It was found that target troughs were only obtained in 20.7% of patients dosed using the nomogram. This subtherapeutic dosing was thought to be caused by a change in the pharmacokinetics of the patient population. An observational retrospective chart review was conducted to assess vancomycin levels to determine the pharmacokinetics parameters of the patients at SJHMC. These parameters were utilized to create a new vancomycin dosing nomogram. **Methods:** This single-center, retrospective, chart review evaluated patients who received intravenous vancomycin. A list of all adult patients who had at least one vancomycin level from October 1 to November 30 2016 was generated from the St. John Pharmacy Information System and were further categorized to include only the patients who had both a peak and trough level obtained while on vancomycin. Patients were excluded if they have unstable renal function (AKI, dialysis, dosing by level or CrCl less than 30 mL/min), incorrectly drawn vancomycin levels (if vancomycin trough was obtained while the vancomycin dose was infusing), pregnant or post-partum (6 months after delivery). Two pharmacokinetic parameters, the elimination rate constant (Ke) and the volume of distribution were estimated for each patient. To determine the elimination rate constant, the Ke equation was updated by plotting the CrCl (x-axis) against elimination rate constant (y-axis) for all patients and determining the line of best fit. This line of best fit became the new equation and was integrated into the new nomogram. **Results:** Results and conclusions will be presented at the Great Lakes Residency Conference

Learning Objectives:

Describe vancomycin's role in therapy and monitoring approaches.
Explain how the vancomycin nomogram was created.

Self Assessment Questions:

Which of the following accurately describes the overall body of literature regarding vancomycin monitoring approaches?

- A: AUC/MIC ratio is preferred by the IDSA guidelines
- B: AUC/MIC ratio is considered to be a surrogate marker for trough c
- C: There is a lack of evidence of clinical outcomes in trials comparing
- D: Peak and trough levels are the preferred method for vancomycin m

The elimination rate constant (Ke) equation is determined by the line of best fit of:

- A: plotting the CrCl (x-axis) against elimination rate constant (y-axis)
- B: plotting the volume of distribution (x-axis) against elimination rate c
- C: plotting the CrCl (x-axis) against volume of distribution (y-axis)
- D: plotting the elimination rate constant (x-axis) against CrCl (y-axis)

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-561L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

OUTCOMES FOR PREVIOUSLY UNTREATED ELDERLY PATIENTS WITH ACUTE MYELOID LEUKEMIA: A COMPARISON OF CLOFARABINE VERSUS FLAG

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Purpose: Acute Myeloid Leukemia (AML) is the most common form of leukemia with the highest mortality rate in adults in the US. Despite a 40% increase in 5-year survival over the past 3 decades in younger patients, survival within the same time period in patients ≥ 60 years old disproportionately increased only 7%. Optimal therapy for AML in elderly patients remains controversial and the presence of comorbid conditions, decreased drug clearance, and an increased proportion of unfavorable cytogenetics all contribute to poor response rates and overall survival (OS). Data regarding the optimal induction strategy in these patients are limited. Our institution utilizes a Clofarabine based (CLO) or FLAG induction regimen upfront for fit elderly AML patients, whereas unfit elderly patients receive Decitabine. **Objective:** The objective of this study is to compare complete response (CR) rates, long-term efficacy outcomes, along with treatment related morbidity and mortality between CLO and FLAG induction regimens. **Methods:** This study will be a retrospective case-control study of elderly patients ≥ 60 years old with AML who were treated at UMHS between January 1st, 2005 and December 31st, 2015 with either CLO or FLAG induction regimens. The primary outcome of the study is the CR rate after induction therapy. Data collection points will include patient demographics, performance status, disease-related information, clinical outcomes, and toxicities. Overall response rate includes CR, CR with incomplete platelet recovery at 28 days, and partial response. Propensity score analysis will be used to minimize bias between both cohorts. Dichotomous variables such as response rates and incidence of toxicities will be analyzed using Fisher's exact test. Continuous outcomes will be compared using Student's t-test and Mann-Whitney U tests. Kaplan-Meier estimated of OS will be performed using the log-rank test and a cox proportional-hazards model

Results/Conclusions: Will be presented at Great Lakes

Learning Objectives:

Describe the epidemiology, pathophysiology, current treatment recommendations, and outcomes for patients ≥ 60 with AML
Explain the pharmacology of nucleoside analogues including clofarabine, fludarabine, and cladribine

Self Assessment Questions:

In the past 40 years, overall survival in patients ≥ 60 with AML

- A: has increased more than patients < 60 years old
- B: has increased about 40%
- C: remains consistently lower than 10%
- D: All of the above

Which of the following is true regarding the pharmacology of nucleoside analogues

- A: Clofarabine has been pharmacologically enhanced to maximize cy
- B: Fludarabine is more cytotoxic than cladribine
- C: Fludarabine, clofarabine, and cladribine are all pyrimidine analogu
- D: Clofarabine has been pharmacologically enhanced to maximize cy

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-334L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION OF A FLUOROQUINOLONE PRESCRIBING TOOL IN RESPONSE TO RECENT FDA LABELING CHANGES

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Purpose: New data suggests that benefits of using fluoroquinolones for the treatment of acute sinusitis, acute bronchitis and uncomplicated urinary tract infections (UTIs) do not outweigh potential risks. The FDA has released new safety warnings and labeling changes for this drug class that address said risks. The objective of this study is to create a tool for providers to use when prescribing fluoroquinolones in order to improve adherence to infectious diseases treatment guideline recommendations. **Methods:** This study has been approved by the Institutional Review Board. A retrospective chart review was conducted to assess initial prescribing trends of fluoroquinolones at St. Joseph Hospital. In collaboration with ID physicians, pharmacists and pharmacy clinical managers, this initial data is being used to develop a guideline for providers to use when prescribing these agents. It has incorporated guideline-recommended uses of fluoroquinolones, recommended dosing and durations of therapy based on the three highlighted uncomplicated infections. A pre-implementation survey was administered to assess pharmacist and provider opinions on the current use of fluoroquinolones at our institution. **Results/Conclusion:** Results of the initial survey showed that 11/22 (50%) pharmacists and 7/17 (41.4%) physicians feel that fluoroquinolones are often prescribed for patients when more appropriate alternative agents are available. In an initial chart review performed at St. Joseph Hospital, 0/75 (0%) patients were prescribed a fluoroquinolone for acute sinusitis, 4/75 (5%) patients were prescribed a fluoroquinolone for acute bronchitis, and 20/146 (13.7%) of patients were prescribed a fluoroquinolone for uncomplicated UTIs. The mean duration of therapy for 75 levofloxacin patients was 7 days and the mean duration of therapy for 71 ciprofloxacin patients was 8 days. Development of the guideline is ongoing and will soon be addressed on a system-wide level throughout the Ascension Ministry. Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review the safety concerns, recent warnings and labeling updates to the fluoroquinolone drug class.

Outline empiric antibiotic recommendations for treatment of acute sinusitis, acute bronchitis and uncomplicated urinary tract infections.

Self Assessment Questions:

Which of the following disease states was mentioned in the summer 2016 FDA Drug Safety Communication which stated that benefits no longer outweigh the risks when using fluoroquinolones for the treatment

- A: Acute sinusitis
- B: Community-acquired pneumonia
- C: Intra-abdominal infections
- D: Non-purulent cellulitis

Which antibiotic would be an appropriate empiric treatment recommendation for the treatment of acute bronchitis in a patient with a type-1 hypersensitivity reaction to penicillin?

- A: Ciprofloxacin
- B: Cefuroxime
- C: Doxycycline
- D: Erythromycin

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-863L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF A HAZARDOUS DRUG COMPOUNDING ROBOTS IMPACT ON PREPARATION ACCURACY, EFFICIENCY, AND COST

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Purpose: The UW Health Pharmacy Department implemented a hazardous drug compounding robot to enhance employee safety, patient safety, and compounding efficiency. Intravenous hazardous drug compounding robots can decrease employee exposure to hazardous drugs and have been shown to increase the accuracy of chemotherapy preparation. Current literature does not suggest hazardous drug compounding robots increase compounding efficiency, and there is no published guidance on how to increase efficiency with robots. Additionally, the cost of operating a hazardous drug compounding robot has not been compared with the cost of using closed-system transfer devices during manual compounding. The purpose of this project is to implement a hazardous drug compounding robot, evaluate the impact on compounding accuracy, efficiency, and supply cost, and determine how to maximize capacity. **Methods:** A steering committee was formed to guide the project team. Baseline hazardous medication compounding workload was quantified and characterized. The accuracy of manual compounding was calculated by weighing the final container before and after drug was added and using the drug's density to determine how much drug was actually added to the final container. IV workflow software timestamps were used to measure compounding times. Supply costs were extrapolated based on the supply costs for individual preparations. An IV hazardous drug compounding robot was installed and will be integrated into pharmacy workflows. Assessment of compounding accuracy, times, and supply costs will be repeated after implementation of the robot and strategies will be developed to maximize capacity. **Results:** Will be shared at the Great Lakes Residency Conference

Learning Objectives:

Describe common barriers to implementation of hazardous drug compounding robots

Recognize and explain the differences between ensuring compounding accuracy with volumetric analysis versus gravimetric analysis

Self Assessment Questions:

Which of the following are barriers to implementation of hazardous drug compounding robots?

- A: EHR interface reconfiguration
- B: Disruption of normal operations during installation
- C: Capital investment costs
- D: All of the above

Which of the following drug properties is necessary for gravimetric analysis of compounding accuracy?

- A: Melting point
- B: Vial size
- C: Molecular weight
- D: Density

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-971L05-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

COST-AVOIDANCE AND SAFETY ASSOCIATED WITH DOSE-ROUNDING ANTICANCER AGENTS

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Purpose: Many intravenous anticancer medications are supplied in single use vials, requiring unused product to be discarded after compounding. Rounding prescribed doses by 5% to 10% to reach the nearest vial size may result in significant cost avoidance. The purpose of this research is to investigate the feasibility of implementing a dose-rounding policy for anticancer medications. The primary objective is to describe potential cost-avoidance associated with rounding doses of five anticancer medications, comparing the difference between 5% and 10% rounding margins. The secondary objective is to compare the rate of patient safety events following administration of physician-rounded doses versus non-rounded doses. The goal is to develop a standardized policy that guides rounding practices for intravenous cytotoxic and biologic anticancer medications at Premier Health. **Methods:** This study consists of a retrospective chart review of all patients who received bevacizumab, nivolumab, pemetrexed, protein-bound paclitaxel, or rituximab at two institutions from January 1, 2015 through November 15, 2016. These five medications were selected based on system use and national expenditure data. Pregnant women, minors, and prisoners were excluded. Collected variables included patient demographics, cancer characteristics including type, stage, and recurrence, anticancer therapy and comorbidities. Prescribed doses were recorded and rounded by 5% and 10%. The cost difference after rounding a dose to the nearest vial size was reported. If the rounded dose did not affect the vial size, then the cost difference was reported as \$0. An observational case-control sub-analysis will be conducted to describe the rate of treatment-related patient safety events following administration of rounded and non-rounded doses. Secondary analyses will investigate the cost of treating safety events, and will be reported in the final cost summary. **Results and Conclusions:** Data collection and analyses are in progress and will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the potential benefits of implementing a dose-rounding policy for anticancer agents.

Identify barriers related to automatically dose-rounding anticancer agents within a pre-specified margin to fit the nearest vial size

Self Assessment Questions:

Which of the following are potential benefits that may be seen following successful implementation of a dose-rounding anticancer agent policy?

- A: Decreased medication waste
- B: Increased dose standardization
- C: Improved inventory management
- D: All of the above

This medication class carries the highest patient and healthcare cost in cancer treatment.

- A: Analgesics
- B: Antiemetics
- C: Biologic anticancer agents
- D: Cytotoxic anticancer agents

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-827L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

TIME TO TREATMENT FAILURE OF PALBOCICLIB AND LETROZOLE AS SECOND-LINE THERAPY OR BEYOND IN HORMONE RECEPTOR-POSITIVE ADVANCED BREAST CANCER

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Palbociclib is an oral, small-molecule inhibitor of cyclin-dependent kinases 4 and 6 (CDK4/6), which play a role in the regulation of cell cycle progression. Palbociclib is approved for the treatment of hormone receptor (HR)-positive, human epidermal growth factor receptor 2 (HER2)-negative advanced or metastatic breast cancer in combination with letrozole as initial endocrine therapy in postmenopausal women. The recommended dose for palbociclib is 125 mg once daily for 21 days followed by a 7-day rest period. At our institution, many metastatic breast cancer patients who progressed on prior endocrine therapies were started on palbociclib once it was FDA-approved. The purpose of this study is to determine palbociclib efficacy in combination with letrozole as a second line of therapy or beyond. This is a single-center, retrospective cohort study of metastatic breast cancer patients who received palbociclib and letrozole between February 1, 2015, and July 31, 2016. Patients were included if the following were met: postmenopausal female, 18 years or older and younger than 90 years, confirmed HR-positive, HER2-negative metastatic breast cancer, and received palbociclib and letrozole as second line endocrine therapy or beyond. Patients were excluded if they were incarcerated or had prior CDK4/6 inhibitor exposure. The primary outcome is time to treatment failure (TTF) of palbociclib in combination with letrozole. Secondary outcomes include: TTF based on median palbociclib dose, TTF of patients who received chemotherapy for metastatic disease, TTF of patients who received luteinizing hormone releasing hormone (LHRH) agonist, progression free survival (PFS) on treatment, and the incidence of grade 3 or higher neutropenia and lymphopenia. Descriptive statistics will be performed according to the type of data contained within each data set. The Kaplan-Meier method will be used to determine TTF and PFS. Data collection is complete, and results will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the FDA-approved indications and recommended dosing regimen of palbociclib.

Describe the mechanism of action of palbociclib.

Self Assessment Questions:

Which of the following statements is false?

- A: The recommended dosing regimen for palbociclib is 125 mg once
- B: Palbociclib is approved for the treatment of HR-positive, HER2-negative
- C: Per the package insert, palbociclib may be dose reduced to 100 mg
- D: Palbociclib is approved in combination with fulvestrant in women with

Which of the following statements describes the mechanism of action of palbociclib?

- A: An inhibitor of BCL-2, an anti-apoptotic protein.
- B: A tyrosine kinase inhibitor that targets human epidermal growth factor
- C: An inhibitor of mammalian target of rapamycin (mTOR).
- D: An inhibitor of cyclin-dependent kinases 4 and 6 (CDK4/6).

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-413L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF CLINICAL PHARMACY SPECIALISTS (CPS) ON PATIENT ALIGNED CARE TEAMS (PACTS) ON IMPROVING GLYCEMIC CONTROL IN COMPLEX DIABETIC PATIENTS

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Purpose: Diabetes is associated with a variety of vascular complications. Improved glycemic control may reduce incidence and progression of vascular complications. The objective of this study is to measure the impact CPS have on glycemic control in difficult to manage diabetic patients. **Methods:** This study was submitted to the University of Cincinnati Institutional Review Board and Cincinnati VAMC Research and Development Committee. The electronic medical record system identified 1,633 patients who had their first appointment with a CPS for diabetes management between January 1, 2011 to December 21, 2015. A random number generator will be used to select 126 patient charts to review. The following data will be collected: patient age, gender, race, sex, Care Assessment Needs (CAN) score; HbA1c levels at baseline and for up to 18 months after initial CPS encounter; medication refill history at baseline and up to 18 months after initial CPS exposure; type of encounter with CPS (face-to-face or phone); if patient takes metformin and/or insulin; and if patient met with a dietician or attended other patient education classes directed toward diabetes management. Patients that missed at least 3 CPS appointments over 18 month period, had less than 2 face-to-face appointments with a CPS, or were using insulin U-500 were excluded from the trial. All data will be recorded without patient identifiers and maintained confidentially. The following primary outcomes will be measured: difference in HbA1c from initiation of CPS-led diabetes to up to 18 months post-initial visit HbA1c (or sooner if appointments were discontinued due to achieving glycemic goal earlier than 18 months) and HbA1c post-CPS led interventions compared to the VA/DoD Diabetes Treatment Guideline HbA1c targets.

Results: Pending. Will present at Great Lake Clinical Meeting. **Conclusions:** Pending. Will present at Great Lakes Clinical Meeting.

Learning Objectives:

Identify the criteria used by the VA/DoD Guidelines for HbA1c goals.
Recognize key trials that showed clinical benefits associated with HbA1c reduction.

Self Assessment Questions:

The VA/DoD Guidelines HbA1c goals are based on what criteria?

- A Life expectancy and comorbidities
- B: Microvascular complications
- C: Total daily insulin dose
- D: A & b

In the Diabetic Control and Complications Trial (DCCT), a 10% reduction in HbA1c was associated with what reduction in incidence and progression of retinopathy and microalbuminuria?

- A 20-30%
- B 30-40%
- C 40-50%
- D 50-60%

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-651L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

A COMMUNITY ONCOLOGY CENTERS EXPERIENCE WITH IMMUNE CHECKPOINT INHIBITORS

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Purpose: Checkpoint inhibitors are changing the landscape of treatment in oncology. The first checkpoint inhibitor, ipilimumab (Yervoy), was approved in 2011, followed by pembrolizumab (Keytruda), nivolumab (Opdivo) and atezolizumab (Tecentriq). Given the rapid growth and relative infancy of the use of checkpoint inhibitors, much information stands to be gained on their use in clinical practice, especially regarding toxicity management. The primary objective of this project is to examine the incidence and characteristics of checkpoint inhibitor toxicity at this institution. Secondary objectives include the development of a multidisciplinary education program and institutional guidelines and tools for managing toxicities. **Methods:** A retrospective chart review will be conducted on 185 patients who have received pembrolizumab, ipilimumab, and/or nivolumab from May 1, 2011 to July 31, 2016. Data to be collected includes patient demographics, disease state, treatment information, and adverse event details. Analysis of the data will focus on treatment toxicity. The results will be presented using descriptive statistics utilizing a simple proportional analysis. This evaluation does not require Institutional Review Board approval, as the findings will be used as a quality improvement measure. Additionally, an educational program will be created in collaboration with oncology pharmacists and medical oncologists who utilize checkpoint inhibitors in clinical practice. This program will consist of a presentation including information on checkpoint inhibitors, their unique toxicities, and appropriate management of these toxicities. The program will then be presented to various medical divisions, inpatient pharmacy, and nursing within the institution. A brief pre- and post- assessment will be administered to assess the effectiveness of the educational program. A tool will also be created in the electronic medical record to assist in the documentation of immunotherapy toxicities. Finally, a multidisciplinary team will develop institutional guidelines for managing immunotherapy toxicities. **Results:** To be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the challenges and opportunities for the management of immunotherapy toxicities in the clinical practice setting
Review the process of improving immunotherapy toxicity management at an oncology institution

Self Assessment Questions:

Which of the following is true of immune checkpoint inhibitor toxicity?

- A Generally occurs within the first three days after treatment
- B: Mainly affects the gastrointestinal and dermatological organ system
- C: Managed similarly to toxicities caused by traditional chemotherapy
- D: Can be life-threatening

Which is a key aspect to improving the management of immune checkpoint inhibitor toxicity in the clinical practice setting?

- A Educating primarily the oncology team
- B Limiting toxicity monitoring to oncology doctor visits
- C Developing institution-wide toxicity monitoring tools and guidelines
- D Deferring all toxicity management decisions to the primary oncologist

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-557L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

A STANDARDIZED PHARMACIST-DRIVEN PROCESS FOR ANTICOAGULATION EDUCATION: EVALUATING THE IMPACT ON PATIENT OUTCOMES AND OPPORTUNITIES FOR OPTIMIZATION

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Purpose: The 2012 Patient Protection and Affordable Care Act emphasized the need for reductions in preventable readmissions. Oral anticoagulants are identified as high-risk medications that contribute to adverse events which frequently cause admission or readmission to the hospital and necessitate focused education. Prior to June 2016, there was no standardized process for pharmacists at Norton Healthcare to identify, assess, or perform counseling for patients receiving oral anticoagulation. Many studies support the incorporation of pharmacists into anticoagulation management because of the positive impacts on outcomes such as decreasing length of stay, enhancing cost-effectiveness, and promoting patient satisfaction. As a result, a standardized pharmacist-driven process for anticoagulation education was implemented. The purpose of this study is to evaluate the impact of the standardized pharmacist-driven process for anticoagulation education on patient outcomes at Norton Healthcare and identify opportunities for optimization of the process. **Methods:** This study is a retrospective chart review of patients discharged from a Norton Healthcare adult hospital on any oral anticoagulant before and after implementation of a standardized pharmacist-driven education process. The primary outcome is a comparison of 30-day readmission rates in patients discharged on anticoagulants before and after standardized process implementation. Three secondary outcomes include a subgroup analysis of all-cause 30-day readmissions, a comparison of anticoagulant-related 30-day readmissions, and pharmacists compliance to new anticoagulation education workflow. **Results/Conclusions:** Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain the rationale for prioritizing hospitalized patients on oral anticoagulants to receive standardized pharmacist-driven education
Describe the impact of a standardized pharmacist-driven process for anticoagulation education on patient outcomes

Self Assessment Questions:

Patients receiving oral anticoagulants are candidates for standardized pharmacist-driven education due to which of the following:

- A: Decreased cost of therapy
- B: Increased risk of adverse events
- C: Diminished tolerability of regimen
- D: Complicated administration technique

Literature supports that a standardized pharmacist-driven process for anticoagulation education can enhance patient outcomes by?

- A: Decreasing readmissions
- B: Minimizing patient costs
- C: Promoting interdisciplinary communication
- D: Generating revenue for hospital

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-797L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PHARMACIST-DRIVEN EDUCATION TO INCREASE ADHERENCE TO EVIDENCE-BASED HEADACHE GUIDELINES IN THE EMERGENCY DEPARTMENT.

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Purpose: Migraine is the world's 7th most common chronic condition accounting for nearly 5 million of all emergency department (ED) visits. Physicians often underutilize migraine-specific medication while over-using opioid medications. The recently published American Headache Society's evidence-based guidelines for treatment of acute migraine in the ED recommends three "should offer" medications: metoclopramide, prochlorperazine and sumatriptan. The objective of this study is to determine to what degree pharmacist-directed education to physicians in the ED can impact the use of opioids and migraine-specific medications in patients with a diagnosis of headache. The secondary outcome will be to determine the impact education has on physicians prescribing migraine specific medications at time of discharge from the ED.

Methods: The electronic medical record system will be used to compile 60-day retrospective data of patients who presented to the ED with chief complaint of headache per international classification of diseases 9 code. Baseline data will include: age, gender, history of headache, any current medications indicated for headache, and any opioid medications. Exclusion criteria will include patients under the age of 18 years old, pregnancy, secondary headache (as defined by the International Headache Society) and documented contraindications to non-opioid headache medications. Next, three 10-minute in-service presentations directed toward physicians in the ED will be conducted. A pocket card summarizing the American Headache Society ED treatment recommendations will be provided at each in-service and a full in-depth powerpoint presentation will be disseminated, via email, to the entire ED physician staff. There will be 60-day data collection after the last in-service to determine the impact on physician medication selection for treatment of headache in the ED and at time of discharge.

Results/conclusions: Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss guideline recommendations for the treatment of acute migraine in the emergency department.

Identify the drawbacks of prescribing opioids or butalbital-containing analgesics for the treatment of migraine

Self Assessment Questions:

According to the American Headache Society, which parenteral pharmacotherapy is a "may be offered" level of treatment for migraine in the ED?

- A: Diphenhydramine
- B: Hydromorphone
- C: Lidocaine
- D: Ketorolac

According to the American Headache Society position statement, opioids may be used for acute migraine only when

- A: A headache has lasted longer than 4 hours
- B: A patient cannot tolerate triptans
- C: The risk of abuse has been addressed and sedation with
- D: The patient has previously responded to an opioid

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-527L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPROVING ATTENDANCE AT AN INTERDISCIPLINARY SMOKING CESSATION DROP-IN GROUP MEDICAL APPOINTMENT BY UTILIZING LEAN PROCESS IMPROVEMENT PRINCIPLES

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Purpose: Approximately 16.8% of adults in the United States smoke, including 30% of active military personnel and 22% of veterans. In 2015 a motivational interviewing based interdisciplinary smoking cessation drop-in group medical appointment (DIGMA) was formed at the Richard L. Roudebush Veterans Affairs Medical Center. The objective of this study is to improve patient attendance at the group to better combat tobacco use by veterans. **Methods:** This quality improvement study will utilize lean process improvement principles to assess barriers to patient attendance at a smoking cessation drop-in group medical appointment (DIGMA). The Computerized Patient Record System will be utilized to identify patients who were referred to the smoking cessation DIGMA, but did not attend. Voice of the customer (VOC) questionnaires will be utilized to assess the barriers that prevent these patients from attending the group appointment. Perceived successes and benefits of the group will be identified via questionnaires from those currently attending the group. Barriers that prevent members of the healthcare team from referring patients to the smoking cessation group will be determined through the use of questionnaires. Themes and data will be extracted from these questionnaires. Subsequent modifications will be made to current practices via rapid experiments to enhance the referral process and attendance surrounding the smoking cessation DIGMA.

Preliminary Results: Preliminary data from the VOC questionnaires show that the majority of healthcare providers questioned are not familiar with the smoking cessation quit group or the referral process. Patients who attend the group report finding value in the group and the groups unique characteristics: drop-in style, interactive veteran involvement, and interdisciplinary nature. Overall, group attendance has improved since increasing discussion about the smoking cessation group. **Conclusions Reached:** Conclusions to be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify the most common barriers to patient attendance at the smoking cessation quit group.

Discuss methods used to improve patient attendance based upon voice of the customer questionnaires from providers and patients.

Self Assessment Questions:

What was the most common barrier to providers referring patients to the smoking cessation quit group?

- A: Patients are not willing to quit smoking
- B: Providers have too many other obligations
- C: Providers are unaware of the group and referral process
- D: Providers prefer to manage their patients' smoking cessation in cli

Which healthcare providers coordinate the smoking cessation quit group at the Richard L. Roudebush VAMC?

- A: Pharmacist and clinical psychologist
- B: Pharmacist and nurse practitioner
- C: Pharmacist and registered nurse
- D: Pharmacist and physician

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-818L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF A HEALTH SYSTEM BASED OUTPATIENT PHARMACY VS. AN EXTERNAL PHARMACY ON ADHERENCE TO CLINIC RECOMMENDED LABORATORY MONITORING FOR ORAL ANTICANCER AGENTS

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Purpose: The purpose of this study is to assess whether a disparity in adherence to clinic recommended laboratory monitoring exists between patients that fill oral anticancer agents (OAAs) at a health system onsite pharmacy when compared to those that fill OAAs at an outside pharmacy. At UI Health, OAAs are dispensed by pharmacists working closely with the health care team. Physicians, clinical pharmacists, and dispensing pharmacists assess lab values and overall condition of the patient prior to dispensing the drug. Patients that fill OAAs at an outside pharmacy might not be so closely monitored. Our hypothesis is that patients who fill OAAs at an onsite pharmacy will be more closely monitored than those that fill at an external pharmacy. **Methods:** A retrospective chart search will be performed on patients treated with the most commonly prescribed OAAs from January 2013 to June 2016. Patients will be separated into two groups: those that received OAAs from the onsite oncology pharmacy, and those that received OAAs from a pharmacy outside the health system. Only patients who remained on an OAA for 90 days or more will be included. Patients whose laboratory monitoring was performed by an outside hospital or lab will be excluded. Clinic recommendations for laboratory monitoring are drug specific and based on the recommendations of medical literature and the drugs manufacturer. Adherence will be measured with respect to the clinic recommendations for each specific drug. Adherence to clinic recommended laboratory monitoring will then be compared between the two groups to determine if a difference exists and appropriate descriptive statistics will be used to analyze the results. **Results:** Research in progress. **Implications/Conclusions:** Consistent monitoring improves care and ensures side effects or toxicities are addressed as early as possible. If any barriers to appropriate monitoring exist, they must be identified and addressed.

Learning Objectives:

Recognize the importance of monitoring patients receiving oral anticancer agents.

Identify techniques that can be utilized to improve adherence to clinic recommended laboratory monitoring.

Self Assessment Questions:

Which is true regarding oral anticancer agents?

- A: They are more convenient than infusion therapy and have no serious
- B: The most significant adverse effect of any oral anticancer agent is
- C: Oral anticancer agents can have serious adverse effects and patients
- D: Labs only should be drawn after the patient has been on drug therapy

Which is a technique that can be utilized to improve adherence to clinic recommended laboratory monitoring?

- A: Calling non-adherent patients every day until they get labs.
- B: Writing prescriptions for 1 month with no refills.
- C: Refusing to treat patients until they sign a contract stating they will
- D: Offering in-home phlebotomy services.

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-707L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

USING READY-MADE PRESCRIBER FAX REQUESTS TO COMPLETE MEDICATION THERAPY MANAGEMENT SERVICES

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Purpose: As reimbursement for medications decreases, community pharmacies must find alternative forms of income to stay profitable. Providing cognitive services, like medication therapy management (MTM), allows pharmacies to find another source of revenue, but barriers to success still exist. The purpose of this study was to evaluate the use of fax forms when consulting prescribers with therapy recommendations. **Methods:** Fax forms were created and distributed to HomeTown Pharmacy retail stores for use in consulting prescribers when providing MTM services using the OutcomesMTM platform over a two-month period. Completion of prescriber consultations following implementation of the forms was compared to one year prior and two months prior to the implementation period. At the end of the study period, a survey was sent to all retail pharmacists at HomeTown Pharmacy to assess practical use of the fax forms. **Results:** During the study period, 203 claims were billed for reasons other than adherence or comprehensive medication review. Of those claims, prescribers were contacted with recommendations 88 times (43.3%). This was a significant increase from the same time period one year prior (28/96, 29.2%, $p=0.019$), but was not statistically significant when compared to two months prior to the study period (19/62, 30.6%, $p=0.074$). Prescribe consultation resulted in therapy change 29.5% of the time during the study period, compared to 42.9% one year prior ($p=0.191$) and 26.3% two months prior ($p=0.778$). Results of the pharmacist survey showed a majority of pharmacists felt they were able to complete more consults using the forms (91.7%) and plan to continue using them in the future (91.7%). **Conclusion:** The use of fax request forms increased the amount of prescriber consultations completed at HomeTown pharmacy, but did not impact the success of those recommendations. Pharmacists were receptive of the forms and plan to continue using them in practice.

Learning Objectives:

Identify barriers to completing medication therapy management services in a community pharmacy.

Describe the benefits to using fax requests to consult providers with drug therapy recommendations.

Self Assessment Questions:

Which one of the following is the most common pharmacist-identified barrier to performing medication therapy management services?

- A: Lack of clinical knowledge
- B: Lack of patient interest
- C: Lack of provider relationships
- D: Lack of patient relationships

Which one of the following did pharmacists identify as a benefit to using a fax requests to contact prescribers?

- A: Increased prescriber acceptance of recommendations
- B: Ability to complete more prescriber requests
- C: Quicker responses from prescribers
- D: Improved relationships with prescribers

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-780L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PHARMACY-LED INPATIENT AND DISCHARGE MEDICATION EDUCATION AND ITS IMPACT ON HCAHPS SCORES, MEDICATION ADHERENCE, MEDICATION ERRORS, AND 30-DAY HOSPITAL READMISSION RATES

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Purpose: Patient outcomes are improved when pharmacists are involved in discharge education. However, data on the benefits of inpatient medication education by pharmacists is lacking. The objective of this study was to determine if routine pharmacy-led inpatient education and discharge education improves patient outcomes and patient knowledge regarding inpatient and outpatient medications.

Methods: This study received approval by the Institutional Review Board. Patients included were 18 years or older and admitted to and discharged from oncology units at University of Louisville Hospital. Patients were consented within five days of admission and randomized according to their admission date. Patients admitted on odd days were randomized to the intervention group, which received medication education at least every five days during admission and at discharge. Patients randomized to the control group received discharge medication education if the primary team consulted pharmacy for medication education, if the patient was prescribed warfarin, or if they were newly diagnosed with congestive heart failure. The control group reflected the current clinical pharmacy standard of care at the study institution. All patients received a post discharge phone survey. The primary outcome of the study was patient satisfaction based on knowledge of their medications. Secondary outcomes included medication adherence, medication errors, and 30 day readmissions to the hospital. Differences between groups in the primary outcome, medication adherence, and medication error outcomes were analyzed utilizing the students t-test for parametric data and Mann-Whitney test for nonparametric data. Differences among 30-day readmissions were analyzed with the Chi-squared test or Fishers exact test if values were less than five.

Results: Results to be presented at GLPRC. **Conclusions:**

Learning Objectives:

Define the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) score

Recognize HCAHPS score significance

Self Assessment Questions:

Which of the following statements is correct?

- A: HCAHPS surveys are specific to each state
- B: HCAHPS scores enable comparisons to be made across all hospitals
- C: HCAHPS scores are available to the Chief Medical and Chief Nurse
- D: The HCAHPS survey focuses solely on communication about medications

HCAHPS scores affect hospital reimbursement in which of the following ways?

- A: Money that is withheld from poor-performing hospitals will be redistributed
- B: Diagnosis Related Group (DRG) payments may be increased or decreased
- C: Hospitals with higher HCAHPS scores may decrease patients' discharge rates
- D: A & B

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-944L05-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DIRECT ORAL ANTICOAGULANTS IN VENOUS THROMBOEMBOLISM: THE IMPACT OF PHARMACIST INTERVENTION IN PRESCRIBING PATTERNS

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Purpose: Venous thromboembolism (VTE) represents a major public health concern due to its significant effect on morbidity and mortality. Treatment after an initial episode consists of vitamin K antagonists, heparin and low molecular weight heparin, and direct oral anticoagulants (DOACs). The 2016 ACCP Chest treatment guideline for VTE recommends DOACs as first line agents in patients without contraindications. The updated recommendation was made based on new available data that supports efficacy and safety of DOACs in VTE patients, and the increase in patient satisfaction due to the decreased monitoring and dietary restrictions with these agents. The purpose of this study is to describe inpatient prescribing practices of DOACs in newly diagnosed patients with VTE, and evaluate the impact of pharmacist intervention in facilitating their use. **Methods:** This was a three phase quasi-experimental study at Henry Ford Hospital in Detroit Michigan from October 2016 to June 2017. Patients >18 years of age, admitted to a general practice unit (GPU), with an active diagnosis of VTE, in the absence of malignancy were included in the study. In phase 1, barriers associated with initiation of DOACs in a GPU were identified, and the appropriateness of dosing regimen at discharge was evaluated. Phase 2 consisted of implementation of a pharmacist intervention that addressed all barriers identified in phase 1. In phase 3, the impact of a pharmacist intervention on the rate of DOAC initiation at discharge was evaluated. The primary endpoints were: the percentage of patients with a new VTE discharged with a prescription for DOACs, and the percentage of prescriptions with appropriate dosing regimen at discharge. Appropriate statistical tests will be used to evaluate the study endpoints. **Results and Conclusion:** Data collection and analysis are currently ongoing. Results and conclusion will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss current guideline recommendations for treatment of patients with venous thromboembolism (VTE)

Describe patient characteristics that affect the selection of direct oral anticoagulants (DOACs) in treatment of VTE

Self Assessment Questions:

1. Which of the following anticoagulation options is recommended as first line treatment for VTE according to The 2016 ACCP CHEST

- A: Warfarin
- B: Apixaban
- C: Enoxaparin
- D: Heparin

2. Which of the following DOACs does not have a creatinine clearance cutoff for the treatment of VTE

- A: Apixaban
- B: Rivaroxaban
- C: Dabigatran
- D: Edoxaban

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-666L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EPIC ALERT REDUCTIONS AT ASCENSION WISCONSIN AND THE DANGERS OF ALERT FATIGUE

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Purpose: Wheaton Franciscan hospitals transitioned to Epic computer systems in May of 2016. As part of the post-Epic "go-live optimization phase", hospital administration expressed interest in a team-based targeted effort to identify, customize, and reduce the number of unnecessary fired alerts that came with initial implementation of the new system. Primary analysis showed that over 485,000 alerts were overridden by healthcare professionals during August alone, so alert reduction efforts were of great interest to Wheaton staff members. **Methods:** Prior to the alert reduction phase, a survey was distributed amongst pharmacy staff within the Wheaton Franciscan system to determine satisfaction/frustration with alerts appearing immediately after the Epic implementation period. This survey was used to guide improvement efforts and target reductions in desired alert categories (drug-drug, drug-disease state, and duplicate medication warning). A pivot table report was run to measure the override rates before the alert reduction phase, and will be run again in February, to quantify the effect of both helpful and unnecessary alert changes made during the alert reduction phase. The alert reduction phase consisted of a coordinated effort between the members of the Wheaton Willow team to identify, improve the quality of, and reduce the quantity of alerts fired for healthcare professionals when signing and verifying orders. After analyzing the override data from August, it was decided that goals of the alert reduction project were to target a 45% reduction in drug-drug alerts, a 70% reduction in drug-disease alerts, and a 30% reduction in duplicate medication alerts. After completion of the alert reduction phase, a satisfaction survey will once again be distributed to staff to help gauge the Wheaton Willow team improvement efforts. **Results/Conclusions:** Final alert reduction comparisons will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the dangers of alert fatigue

Describe the methods and alert categories identified for primary reduction efforts

Self Assessment Questions:

Which of the following is true regarding the dangers of alert fatigue?

- A: Can lead to increased productivity for providers
- B: Is not a very common issue in hospital systems
- C: Can cause important alerts to be ignored along with clinically unimportant alerts
- D: Is often generated as a result of conflicting clinical decision support

Which of the following alert categories was identified for primary reduction efforts in this project?

- A: Drug-allergy
- B: Drug-disease
- C: Dosing
- D: Geriatric

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-941L05-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

CHARACTERIZATION OF HYPERGLYCEMIC EPISODES AMONG NON-CRITICALLY ILL HOSPITALIZED PATIENTS WITHIN A COMMUNITY HOSPITAL

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Purpose: Numerous studies have demonstrated hyperglycemia among hospitalized patients can result in an increase in infections rates, mortality, hospital length of stay, and higher healthcare related expenses. The purpose of this study is to characterize hyperglycemic episodes based on current hospital practices. Results will be utilized to improve existing practices and develop new strategies to improve glycemic control in hospitalized non-critically ill patients. **Methods:** This study will be submitted for Institutional Review Board approval. This is an observational, retrospective chart review of non-critically ill patients admitted to medical inpatient units from April 1, 2016 to June 30, 2016 receiving oral anti-hyperglycemics or insulin therapy for at least 48 hours. Medical records will be obtained for all adult patients with hyperglycemic events as defined by blood glucose levels greater than 180 mg/dL. Subjects who are not receiving anti-hyperglycemic therapy prior to admission or during inpatient stay, admitted to medical inpatient floors for less than 48 hours, admitted with diabetic ketoacidosis or hyperosmolar hyperglycemic state, receiving insulin drips or on an insulin pump, and receiving total parental nutrition containing insulin will be excluded. Data to be collected includes: demographic information, inpatient hyperglycemia treatment including medication name, dose, route, frequency, date and time administered or omitted dose, home hyperglycemia medications, point-of-care blood glucose levels, hemoglobin A1c, nutrition status, admitting diagnosis, comorbidities, and use of corticosteroid during hospitalization. All subject data reported will be de-identified and will be maintained confidentially. **Results and Conclusion:** To be presented at Great Lakes Pharmacy Resident Conference

Learning Objectives:

Discuss poor outcomes associated with hyperglycemia in an inpatient setting.

Identify factors that can contribute to hyperglycemic episodes among non-critically ill hospitalized patients.

Self Assessment Questions:

Which of the following can result from hyperglycemia in an inpatient setting?

- A Increase in hospital length of stay
- B Decrease in infection rates
- C Increase in mortality rates
- D Both A and C

All of the following factors can contribute to hyperglycemia in hospitalized patients except:

- A Stress associated with acute illness
- B Inpatient use of corticosteroids
- C Patient's NPO dietary status
- D Holding patient's home anti-hyperglycemic agents

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-497L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

CLINICAL OUTCOMES WITH PENICILLIN VERSUS ALTERNATIVE BETA-LACTAMS IN THE TREATMENT OF PENICILLIN-SUSCEPTIBLE STAPHYLOCOCCUS AUREUS BACTEREMIA

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Purpose: The prevalence of penicillin-susceptible *S. aureus* (PSSA) has increased in recent years. However, non-penicillin beta-lactams are often utilized for the treatment of PSSA bacteremia. While several studies have evaluated the efficacy of beta-lactams in methicillin-susceptible *S. aureus* bacteremia, there is limited data on the management of PSSA bacteremia and its associated outcomes. The purpose of this study is to compare clinical outcomes associated with penicillin versus alternative beta-lactams for the treatment of PSSA bacteremia. **Methods:** This is a retrospective study evaluating patients with PSSA bacteremia between July 2011 and June 2016. Patients age 18 to 89 with a first (index) positive blood culture for PSSA who received an intravenous beta-lactam antibiotic as definitive therapy are eligible for evaluation. Exclusion criteria include patients transferred from an outside hospital with unknown culture data, patients with recurrent PSSA bacteremia whose index positive blood culture was drawn at an outside hospital, patients who received less than 48 hours of active therapy, pregnancy, and prisoners. The primary objective is to evaluate the composite end point of 30-day clinical failure (i.e., change in PSSA therapy due to persistent or worsening signs and symptoms, PSSA bacteremia recurrence or persistence, and/or infection-related mortality) in patients with PSSA bacteremia treated with penicillin versus alternative beta-lactam antibiotics. Secondary objectives include time to microbiological clearance, hospital and infection-related length of stay, 90-day bacteremia recurrence, 90-day infection-related readmission, 30-day all-cause mortality, and adverse drug events. Penicillin will be compared to other beta-lactams using Chi-square or Wilcoxon rank sum test as appropriate. Simple and multivariable logistic regression models will be used to estimate the crude and adjusted odds ratio and 95% confidence interval to assess the strength of association with 30-day clinical failure. **Results and Conclusions:** Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the prevalence of PSSA and current literature for management of PSSA bacteremia

Identify the impact of beta-lactams on clinical outcomes in patients with PSSA bacteremia

Self Assessment Questions:

In 2013, what percentage of *S. aureus* isolates in the US was susceptible to penicillin?

- A 5.4%
- B 9.6%
- C 13.5%
- D 25%

Which of the following antibiotics is most likely to cause transaminitis?

- A Penicillin
- B Nafcillin
- C Cefazolin
- D Ceftriaxone

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-361L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF ANTIBIOTIC TREATMENT DURATION FOR SYMPTOMATIC LOWER URINARY TRACT INFECTIONS IN KIDNEY TRANSPLANT RECIPIENTS

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Background: Urinary tract infections (UTIs) remain the most common infectious complication post kidney-transplantation and may cause significant morbidity and mortality. Treatment duration for symptomatic lower UTIs in kidney transplant recipients (KTRs) remains undefined with recommendations ranging from 5 to 14 days. We assessed the impact of antibiotic treatment duration for symptomatic lower UTIs in KTRs. **Methods:** A single-center, matched (1:1 based on antibiotic used), retrospective cohort study of adult KTRs between January 2009 and June 2015 was conducted comparing ≤ 7 days of antibiotics to > 7 days of antibiotics for the treatment of symptomatic lower UTIs between post-transplant days 8 and 180. Patients with asymptomatic bacteriuria, urological complications, pyelonephritis, or multi-organ transplantation were excluded. The primary outcome was a composite of recurrence of symptomatic lower UTI and incidence of pyelonephritis. Secondary endpoints included allograft-related outcomes. Risk factors for the primary outcome were determined using a step-wise backward logistic regression. **Results:** 395 KTRs with positive urine cultures were screened; 48 patients met inclusion criteria. Baseline demographics did not differ between the two groups. 12.5% of KTRs treated with ≤ 7 days of antibiotics developed recurrent lower UTIs or pyelonephritis compared to 33.3% of patients treated with > 7 days (OR 0.29, 95% CI [0.07-1.25], $p = 0.17$). Furthermore, no significant differences in secondary outcomes were seen. Independent predictors of the primary outcome included age (OR 1.15, 95% CI [1.01-1.31], $p = 0.04$) and living unrelated KTRs (OR 139.81, 95% CI [2.50-7806.71], $p = 0.02$). Antibiotic de-escalation to a narrower spectrum agent was possible in 45.83% of patients in this study. **Conclusion:** KTRs with symptomatic lower UTIs who received shorter durations of antibiotics have similar infection and graft-related outcomes when compared to those who received longer durations. Randomized, controlled trials with a larger study population are warranted to evaluate the most appropriate duration of antibiotic therapy

Learning Objectives:

Explain the current AST and IDSA treatment recommendations for urinary tract infections

Recall the risk factors for recurrent symptomatic lower urinary tract infections and pyelonephritis

Self Assessment Questions:

What is the optimal duration of treatment for symptomatic lower urinary tract infections in kidney transplant recipients?

- A: 5 days
- B: 7 days
- C: 10 days
- D: Unknown

Which of the following is a risk factor for recurrent urinary tract infections and pyelonephritis?

- A: Age
- B: Deceased donor kidney transplants
- C: Induction with anti-thymocyte globulin
- D: Time to ureteral stent removal

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-318L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ACUTE ALCOHOL WITHDRAWAL: REDUCTION OF TREATMENT VARIATION THROUGH GUIDELINE IMPLEMENTATION

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Acute alcohol withdrawal syndrome (AAWS) is a common clinical condition that can complicate patients clinical picture, such as increased length of stay, escalation of care, seizure, delirium tremens, or can be the cause for admission. It is important to have standardized treatment of AAWS. Currently at the University of Wisconsin (UW) Health, treatment includes symptom-triggered treatment with benzodiazepines based on the Clinical Institute Withdrawal Assessment of Alcohol, revised (CIWA-Ar) scale, but there is no clinical guidance for treatment when this fails. Additionally, there is no consensus on how to prevent AAWS or for prescribing adjunctive agents. The purpose of this project is to reduce treatment variation of AAWS with evidence based medicine, better predict which patients are at risk for AAWS, better characterize AAWS in intubated patients, and to prevent AAWS in high-risk patients admitted to the Intensive Care Unit (ICU) through guideline implementation. The scope of the guideline was determined after meeting with key stakeholders. A literature review was performed to identify medications and doses appropriate for the treatment and prevention of AAWS. Possible screening tools to better predict which

patients might experience AAWS were investigated. An AAWS guideline is currently being written, after which approval will be sought by various committees before being implemented hospital wide. An order set will be developed based on the recommendations within the guideline to facilitate implementation. Outcomes pre and post implementation will be measured, to include ICU and hospital length of stay, days on the ventilator, mortality, and number of times the order set is used. Data collection is ongoing; results will be presented at Great Lakes Conference.

Learning Objectives:

Describe the different biomarkers that can be used to detect chronic alcohol use.

Identify evidenced based pharmacologic options for adjunctive treatment for acute alcohol withdrawal syndrome.

Self Assessment Questions:

Which of the following is a biomarker that can be used to detect chronic alcohol use?

- A: Phosphatidylethanol (PEth)
- B: Ethyl Glucuronide (EtG)
- C: Aspartate Aminotransferase (AST) and Alanine Aminotransferase
- D: Both A and B

Which of the following are evidenced based pharmacologic options for the adjunctive treatment of AAWS?

- A: Dexmedetomidine
- B: Gabapentin
- C: Phenobarbital
- D: All of the above

Q1 Answer: D Q2 Answer: D

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EVALUATING FACTORS CONTRIBUTING TO UNPLANNED READMISSIONS FOR MEDICATION THERAPY MANAGEMENT INTERVENTIONS IN A COMMUNITY HOSPITAL

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Purpose: Unplanned hospital readmissions are common and costly and current risk scoring tools are not oriented towards clinical pharmacist interventions. The objective of this study is to evaluate the associations between selected non-medication and medication-related parameters and unplanned 30-day, 3-month and 6-month readmissions. The results from this study will be used to develop a practical prediction tool that identifies patients who may benefit from medication therapy management pharmacy services.

Methods: This retrospective, cohort study has been approved by the Carle Foundation Hospital Institutional Review Board. Patients who were admitted to Carle Foundation Hospital between January 1, 2013 and December 31, 2015 with a discharge diagnosis of acute heart failure decompensation, acute myocardial infarction, chronic obstructive pulmonary disease exacerbation or pneumonia will be identified via the electronic medical record. Independent associations between the various selected parameters and 30-day, 3-month and 6-month readmissions will be determined using bivariate and multivariate regression analysis. Parameters selected for investigation will include specific diagnoses in past medical history, patient demographics, insurance status/type, number of medications on admission and discharge, length of stay, time since last readmission, specific classes of medications on admission and discharge, number of pharmacies on file, and presence or absence of a primary care provider on file.

Results/Conclusions: Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference pending further data collection and analysis.

Learning Objectives:

Identify parameters that are associated with risk for hospital readmission
Discuss pharmacist interventions that may address identified risk factors

Self Assessment Questions:

Which of the following are diagnoses currently targeted by the Medicare Readmissions Reduction Program?

- A Stroke and pneumonia
- B: Acute myocardial infarction and heart failure
- C: Heart failure and urinary tract infection
- D: Pneumonia and gastrointestinal bleed

Which of the following is an opportunity for pharmacist intervention in the transition-of-care process?

- A Discharge medication reconciliation
- B Medication counseling prior to discharge
- C Identifying and resolving barriers to medication adherence
- D All of the above

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number

Activity Type: Knowledge-based Contact Hours: 0.5
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ACCESS TO HEPATITIS C DIRECT-ACTING ANTIVIRAL MEDICATIONS AT AN ACADEMIC MEDICAL CENTER IN PATIENTS WITH HCV GENOTYPE 1

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Background: Hepatitis C affects an estimated 3.5 million persons in the United States every year, of which the hepatitis C virus (HCV) genotype 1 comprises 70-80% of these infections. Prior to initiating treatment of the direct-acting antiviral medications, HCV genotype 1 infections were the most difficult to eradicate. Approximately only one-third of these HCV infected individuals were uninsured in 2013. The creation of the Affordable Care Act (ACA) increased access to insurance and care in this population and ultimately, leading to increase in the treatment of HCV. Pharmacists play an integral role in facilitating the complex processes of specialty medications such as the DAA medications. It has been demonstrated that clinical pharmacists have identified and responded to opportunities for improvements in medication use, assisted with adverse effects, drug compliance, disease state and medication education, and overall treatment goals. These activities are thought to increase the probability of HCV treatment success along with access to care. **Purpose:** The objective of this study is to identify how access to direct-acting antiviral medication has increased since 2014.

Methods: This will be a retrospective cohort study of patients who received treatment with direct-acting antiviral (DAA) agents from September 1, 2014 to August 31, 2016 at the outpatient Northwestern Medicine Hepatology Clinic. Patients 18 years of age or older who received treatment with DAA agents and participated in visits with the clinical pharmacist were included in the study. Patients will be excluded if they were less than 18 years of age and resided outside the state of Illinois. The primary outcome of this study to determine the number of prior authorization denials prior to receiving coverage of prescribed medication. A secondary outcome to be evaluated will include patients insurance coverage i.e. Medicare, Medicaid or private insurance. **Conclusions:** Final results and conclusions are pending completion.

Learning Objectives:

Review available treatment options for hepatitis c virus (HCV) genotype 1
Discuss the role of a clinical pharmacist in assisting patients access to direct acting anti-viral agents for hepatitis C treatment

Self Assessment Questions:

1) Which of the following combinations of direct acting antiviral medications is currently the most prescribed first line agent for treatment of hepatitis C virus (HCV) genotype 1?

- A Ledipasvir 90mg/Sofosbuvir 400mg (Harvoni)
- B: Simprevir 150mg/sofosbuvir 400 mg (Olysio/Solvaldi)
- C: Elbasvir 50mg/Grazoprevir 100mg (Zepatier)
- D: Daclatasvir 60mg (Daklinza)/ sofosbuvir 400 mg (Solvaldi)

The clinical pharmacist role in increasing access to care include which of the following:

- A Assisting patients in completing prior authorization forms
- B Disease state management and education
- C Paying for patient's medication costs
- D Encouraging delaying treatment of HCV until patient can afford it

Q1 Answer: C Q2 Answer: A

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PIPERACILLIN-TAZOBACTAM VERSUS AMINOGLYCOSIDE-BASED ANTIBIOTIC PROPHYLAXIS THERAPY FOR TYPE III OPEN FRACTURES

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Purpose: Antibiotics have been shown to decrease the frequency of infections in open long bone fractures. Left untreated, type III open fractures are associated with up to 50% infection rates. Due to the risk of nephrotoxicity and complicated dosing regimens of aminoglycosides, a new antibiotic prophylaxis protocol using piperacillin-tazobactam for type III open fractures was implemented in 2015 at The Ohio State University Wexner Medical Center (OSUWMC). The aim of this study is to compare adverse event rates in patients with open fractures before and after the change in practice. **Methods:** This retrospective cohort study of adult patients with type III open extremity fractures admitted to OSUWMC from January 2010 to October 2016. Sequential patients from the OSUWMC Trauma Database will be screened against inclusion and exclusion criteria. Patients will be included if they were admitted for ≥ 24 hours and received high-dose tobramycin plus cefazolin or piperacillin-tazobactam for type III open fractures. Patients with traumatic amputation, receiving hemodialysis or incarcerated upon admission will be excluded. The primary outcome is the rate of adverse events, defined as a composite score of surgical site infection, incidence of nephrotoxicity and hospital readmission related to open fracture. Secondary outcomes include the rate of surgical site infection at 30 and 60 days from injury. A sample size of 153 patients (pre-protocol, $n=102$ post-protocol, $n=51$) is needed to detect a 5% decrease in the incidence of adverse events at 80% power. Student t and the Mann-Whitney U tests will be used for continuous variables and chi-square or Fisher's exact tests will be used for categorical variables. A two-tailed significance < 0.05 will be considered statistically significant. **Results:** Data collection and analysis is ongoing. Final results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review current literature related to rates of infections in type III open fractures.

Identify the incidence of adverse events associated with high-dose tobramycin compared to piperacillin-tazobactam prophylaxis antibiotic regimen in long bone open fractures.

Self Assessment Questions:

Which of the following is most likely to increase the risk of infection in patients with open long bone fractures

- A: Antibiotics administered within 2 hours of injury
- B: Comorbidities such as diabetes and chronic kidney disease
- C: Hospital stay less than 48 hours
- D: Wound debridement

Which of the following agent(s) contributes to a higher risk of nephrotoxicity

- A: Aminoglycosides
- B: Contrast media
- C: Vasopressors
- D: All of the above

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-456L01-P

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HEMODYNAMIC CHANGES DURING PROCEDURAL SEDATION WITH "KETOFOL" IN THE EMERGENCY DEPARTMENT

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Purpose: The goal of procedural sedation in the emergency department (ED) is to provide safe and effective analgesia and sedation. Little information is available regarding the hemodynamic effects of ketamine plus propofol ("ketofol") as compared to alternative agents. Etomidate with or without fentanyl has shown to maintain hemodynamic stability during procedural sedation leading to patient and provider satisfaction. The objective of this study is to determine if "ketofol" has significant effects on hemodynamic stability while being used for procedural sedation in the ED compared to etomidate with or without fentanyl. **Methods:** A retrospective, case-control study of patients undergoing procedural sedation in the ED was conducted at University of Louisville Hospital. Patients over the age of 18 who received ketamine, propofol, or etomidate for procedural sedation from August 4, 2013 to August 4, 2016 were screened for inclusion. The treatment group included patients who received "ketofol" while the control group was those who received etomidate with or without fentanyl. Patients undergoing procedural sedation by other means or who are allergic to any of the study medications were excluded. The primary endpoint was defined as a change in systolic blood pressure (classified based on a change from baseline of greater than 20%, a change between 20% and 50%, or a change greater than 50%). Secondary endpoints included changes in heart rate, diastolic blood pressure, respiratory rate, oxygen saturation, and cumulative doses of sedative and analgesic agents. Chi-square tests were used to assess discrete data such as mean change in systolic blood pressure. Student's t tests were used for continuous data such as cumulative doses of sedative and analgesic agents.

Results/Conclusion: Results and conclusions will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss guideline recommendations for procedural sedation

Describe the potential benefits of using "ketofol" as compared to propofol or ketamine alone

Self Assessment Questions:

The 2014 Clinical Policy for procedural sedation and analgesia in the emergency department grades "ketofol" as having what level of evidence?

- A: Level A for adults
- B: Level C for children
- C: Level B for children and adults
- D: A and B

Ketamine is proposed to negate which adverse effect(s) of propofol?

- A: Hypotension
- B: Nausea
- C: Respiratory depression
- D: A and C

Q1 Answer: C Q2 Answer: D

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EVALUATION OF A VIRTUAL PHARMACY-LED MEDICATION RECONCILIATION PILOT PROGRAM

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Purpose: Patients experience many transitions within the healthcare system, creating a constantly evolving medication list. Because of these frequent changes that occur, ensuring accurate medication reconciliation is of utmost importance to prevent medication errors and adverse drug events. Multiple studies have looked at the accuracy of medication reconciliations conducted by pharmacy technicians as compared to nursing and have found favorable results with pharmacy technicians. There is little research surrounding telepharmacy models for medication reconciliation, which could be useful for expanding these programs. The study will compare the accuracy of virtual medication reconciliation to in-person medication reconciliation as conducted by pharmacy personnel, evaluate workflow implications of a virtual model, and assess satisfaction of physicians, nursing, and pharmacy staff. **Methods:** This is a retrospective, multi-center chart review of a virtual pharmacy medication reconciliation pilot program conducted at OhioHealth Grady Memorial Hospital (GMH) by technicians and pharmacists from two free-standing emergency departments (FSEDs). The pilot included patients age 18 or older admitted from the emergency departments (ED) at the FSEDs and GMH over two 60-day periods. The in-person group will be comprised of patients from the FSEDs, while the virtual group will include those from GMH. In the virtual pilot, pharmacy staff at the FSEDs were contacted by the nursing staff when a patient was being admitted and deemed appropriate for medication reconciliation at GMH. When pharmacy personnel were ready to speak with the patient, they contacted the nursing staff to transport the virtual communication technology into the room. Once the technology was ready, pharmacy personnel interviewed the patient/family. Pharmacy staff documented the encounter in the EMR after conducting the interview and updating the list for physician review. **Results:** Data collection and analysis is currently in progress. Results and conclusions will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize the importance of medication reconciliation

Describe the virtual medication reconciliation model piloted at OhioHealth

Self Assessment Questions:

Which of the following groups have been shown to provide medication histories with similar or better completeness and accuracy as compared to other health care professionals?

- A Patient Support Assistants
- B Pharmacy Technicians
- C Occupational Therapists
- D Medical Lab Technicians

How did the pharmacy personnel interact with the patients in the pilot?

- A Telephone
- B Email
- C Live video conferencing
- D Through the nurse

Q1 Answer: B Q2 Answer: C

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FLUOROQUINOLONE USE IN ACUTE UNCOMPLICATED CYSTITIS IN THE AMBULATORY SETTING

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Background: Urinary tract infections (UTIs) are considered to be the most common bacterial infection. Approximately 10.5 million office visits to providers were due to UTI symptoms in 2007, which accounted for nearly 1% of all ambulatory encounters. According to the Infectious Diseases Society of America 2010 guidelines for management of uncomplicated acute cystitis, there are 3 recommended empiric treatment regimens: nitrofurantoin 100mg by mouth twice daily for 5 days, trimethoprim-sulfamethoxazole 160-800mg by mouth twice daily for 3 days, or fosfomycin 3g by mouth for 1 dose. Fluoroquinolones have clinical efficacy, but are considered to be second line drugs because they have a high risk for collateral damage. **Objectives:** The objective of this study is to characterize the proportion of antibiotics that were fluoroquinolones prescribed to women who were diagnosed with uncomplicated cystitis at ambulatory clinics at University of Illinois Hospital and Health Sciences System (UI Health). **Methods:** This is a retrospective, cross-sectional study of women prescribed antibiotics for uncomplicated cystitis at ambulatory clinic visits at UI Health between June 1, 2011 and July 1, 2016. Patient demographics, insurance type, prescriber information, antibiotic information, medical history, allergies, temperature, and creatinine clearance will be collected. The primary endpoint is the proportion of antibiotics prescribed for acute uncomplicated cystitis that were fluoroquinolones. The secondary endpoints are the proportion of first-line antibiotics, proportion of -lactam antibiotics, incident cases of Clostridium difficile infections within 90 days of receiving antibiotic therapy, and predictors of antibiotic selection and length of therapy. **Results/Conclusion:** Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the reasons why collateral damage is a consideration for acute uncomplicated cystitis.

Identify collateral damage caused by fluoroquinolones.

Self Assessment Questions:

What characteristic of acute uncomplicated cystitis warrants consideration of collateral damage from clinically efficacious drugs like fluoroquinolones?

- A Low incidence of infection
- B Minimal risk of progression to sepsis
- C High risk of treatment failure
- D High risk of further tissue invasion

Compared to alternatives, what is fluoroquinolone use for the treatment of UTI associated with?

- A More favorable risk:benefit ratio
- B A narrower spectrum of activity
- C Higher risk of inducing drug resistance
- D Reduced treatment duration

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-496L01-P

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DOCUMENTING AND BILLING FOR WASTE FOR SINGLE USE VIALS OR PACKAGES WITHIN A HEALTH SYSTEM

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Effective January 1st, 2017, the Centers for Medicare and Medicaid Services (CMS) required providers to use the JW modifier on Medicare part B drug claims for single use vials or packages. The JW modifier is used to report the amount of unused medication from a single use package. Medicare part B will pay for drug that is discarded properly, up to the smallest vial size available. The CMS also requires appropriate documentation within the patients chart, which includes the vial size, dose administered, and exact amount of drug wasted. The purpose of this project is to implement an effective and sustainable process for documenting and billing for waste on single use medications. A steering committee that consists of pharmacy administrators and a pharmacy resident was created to manage this project. A project plan was also developed in order to meet deadlines and keep the project moving forward. The pharmacy resident identified and created a list of single use medications that met CMS standards and would require waste. After reviewing the options available within our electronic health record (EHR), the decision was made to document waste during the dispense preparation process. A new workflow process was designed, approved, and implemented within the pharmacy technicians daily responsibilities. This process was initiated before the January deadline as a test run to fix any errors and issues before going live. The steering committee also met regularly with the auditing and billing department to ensure that the documentation and billing information met CMS standards. The accuracy of waste documentation and missing waste documentation were analyzed to determine if the workflow process was effective and sustainable. Descriptive statistics will be utilized to analyze the results. This project is exempt from the institutional review board as it is a quality assurance project.

Learning Objectives:

Describe waste documentation requirements per CMS regulations

Explain how to convert waste amount to billing units

Self Assessment Questions:

Which of the following information is required for waste documentation?

- A Vial size
- B: Amount of diluent used
- C: Diluent type
- D: Number of doses

Which scenario correctly matches the waste and JW modifier per CMS regulations? (For this question, one billing unit is equal to 10mg)

- A Waste = 5mg; JW modifier = 2 billing units
- B Waste = 9mg; JW modifier = 1 billing unit
- C Waste = 20mg; JW modifier = 2 billing units
- D Waste = 15mg; JW modifier = 2 billing units

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-786L04-P

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A COMPARISON OF FIXED-DOSE NOMOGRAM VERSUS PATIENT-SPECIFIC MANAGEMENT DOSING OF VANCOMYCIN: A RETROSPECTIVE STUDY

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Purpose: Several different strategies currently exist for the empiric dosing of vancomycin. This study compared a fixed dose nomogram with patient-specific vancomycin dosing to determine the percentage of patients who achieved a therapeutic steady state trough based on their clinical condition. **Method:** This retrospective cohort study compared patients who received vancomycin using an empiric patient-specific dosing strategy at Bronson Methodist Hospital with patients who received a fixed dose nomogram at Bronson Battle Creek Hospital. Adult patients were included if they received treatment with vancomycin, had vancomycin levels drawn at steady state (received ≥ 4 doses), and had stable renal function (no fluctuation of SCr greater than 0.3) prior to initiation of vancomycin. Patients were excluded if their age was less than 18 years, pregnant, on dialysis/CRRT, received short duration of vancomycin treatment (received ≤ 3 doses), on vancomycin prior to admission, or who had unstable renal function 24 hours prior to or during treatment with vancomycin. The primary outcome is percentage of patients who achieved a steady state vancomycin trough of 10-14.9 or 15-20 mcg/mL between the fixed dose nomogram and patient-specific dosing management. Secondary objectives are to characterize vancomycin levels that are subtherapeutic or supratherapeutic, the rates of nephrotoxicity during vancomycin therapy, to evaluate clinical outcomes, and to compare the distribution of dosing regimens and costs of care between sites. **Results and Conclusions:** Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the difference in efficacy, clinical outcomes, costs of care, and toxicity between two different methods of dosing vancomycin.

Identify the advantages and disadvantages of patient specific dosing vs. fixed dosing management of vancomycin.

Self Assessment Questions:

What pharmacokinetic parameters does vancomycin have?

- A Cmax/MIC
- B: T>mic
- C: Auc/mic
- D: Both A and B

Which of the following diseases caused by Staphylococcus aureus have a goal trough of 10 to 14.9 mcg/mL for vancomycin per Infectious Disease Society of America (IDSA) guidelines?

- A Bacteremia
- B Osteomyelitis
- C Skin and soft tissue infection
- D Hospital-acquired pneumonia

Q1 Answer: C Q2 Answer: C

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VENOUS THROMBOEMBOLISM PROPHYLAXIS IN TRAUMA PATIENTS

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Purpose: The American College of Chest Physicians recommends use of mechanical and/or chemical venous thromboembolism (VTE) prophylaxis in trauma patients, depending on VTE risk stratification. A survey of St. Vincent Anderson Regional Hospital by the American College of Surgeons reported that patients were not consistently receiving chemical VTE prophylaxis. In response, physician education was provided. This study aimed to measure the impact of physician education on the use of chemical VTE prophylaxis in trauma patients. **Methods:** This study was approved by the Institutional Review Board. All patients admitted with a trauma diagnosis between March 1, 2016 and January 31, 2017 were reviewed for inclusion. The primary objectives were to report and compare rates of chemical VTE prophylaxis utilization prior to and after the physician education intervention. Secondary objectives were to report and compare rates of VTE, stroke, myocardial infarction (MI), and readmission for or death from VTE, stroke, or MI. For the safety endpoint, rates of major bleed were compared. Unpaired t-test, Mann-Whitney U test, chi-square test, and/or logistic regression analysis were utilized depending on the level of analysis and type of data. P-values ≤ 0.05 were considered significant. **Results:** In the pre-intervention period, 16 patients met criteria for receipt of chemical VTE prophylaxis. Of these, 6 (38%) received enoxaparin and 1 (6%) received heparin. Of the patients that received enoxaparin, 4 (25%) had enoxaparin prophylaxis initiated within the recommended time frame, and only 1 (6%) had enoxaparin prophylaxis initiated at the correct dose. Comparison of pre-intervention and post-intervention data will be presented. **Conclusion:** To be presented.

Learning Objectives:

Discuss VTE prophylaxis recommendations in trauma patients based on risk stratification

Describe the impact of a physician education intervention on VTE prophylaxis prescribing practices and patient outcomes

Self Assessment Questions:

Which of the following is an appropriate VTE prophylaxis regimen for a trauma patient?

- A: aspirin 81mg daily
- B: warfarin 5mg daily
- C: enoxaparin 100mg twice daily
- D: enoxaparin 30mg twice daily

In a patient with a traumatic brain injury requiring ICP monitor placement, when could chemical VTE prophylaxis be initiated according to TQIP recommendations?

- A: TQIP guidelines do not recommend chemical prophylaxis. Consider
- B: 24 hours
- C: 48 hours
- D: 72 hours

Q1 Answer: D Q2 Answer: A

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PROVIDER AND PATIENT/CAREGIVER PERCEPTIONS OF TELEVISION-BASED EDUCATION IN THE ICU

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Purpose: Patient health care understanding and low health literacy have been shown to be a multi-factorial challenge that health systems face in their attempts to educate and care for patients. In the inpatient hospital environment, numerous strategies have been adopted to increase patient health care understanding including daily provider education during rounds, provider discharge teaching, printed information, and 24/7 kiosks that are brought into the patients room. However, to date, health systems continue to seek the most optimal, time efficient, and meaningful education for their patients. The ideal education platform would increase the patients knowledge and comfort level regarding their disease state, such that they are sufficiently equipped at managing their health care decision making during their inpatient stay and at home. Our institution recently adopted the Get Well Network (GWN), a television-based education system which can be tailored to the patients disease state. The purpose of this study was to assess the perceptions of nursing staff, providers, and patients/caregivers regarding television-based education in the ICU. **Methods:** Three distinct Likert scale surveys assessing perceptions on effectiveness of television-based health care education were developed, piloted and distributed. ICU areas surveyed included a Cardiovascular ICU, Medicine ICU, Surgical/Trauma ICU, and Neurology/Neurosurgical ICU. Surveys were distributed to nurses, providers and patients/caregivers admitted to the ICU. The nursing and provider surveys were distributed through email. Patients and caregivers admitted to the ICU participating in the GWN program at UK HealthCare will receive standardized education with six introductory videos. The patient survey will appear on the television screen after videos are watched. Data is being stored through REDCap and the GWN server.

Results/Conclusions: Survey data is currently being collected and analyzed. Preliminary results and conclusions will be presented at the 2017 Great Lakes Residency Conference.

Learning Objectives:

Discuss the types of patient/caregiver education modalities and the literature supporting their effectiveness

Identify nursing, provider, and patient/caregiver perceptions of television based education

Self Assessment Questions:

Video-based education, when compared to verbal education, has been shown to increase patient knowledge:

- A: True
- B: False
- C: Unsure
- D: There is not data

By utilizing television-based education via the GWN, other institutions have been able to achieve the following outcomes:

- A: Reduce patient falls
- B: Decrease asthma readmissions
- C: Increased patient satisfaction
- D: All of the above

Q1 Answer: A Q2 Answer: D

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COMPARISON OF CLOSTRIDIUM DIFFICILE INFECTION (CDI) RATES IN ANTIMICROBIAL REGIMENS FOR DIVERTICULITIS

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Clostridium difficile infection (CDI) is a costly yet preventable nosocomial infection and has potential for substantial morbidity and mortality. The primary objective of this study is to assess the hospital-acquired CDI (HA-CDI) incidence related to diverticulitis treatment in regimens containing metronidazole versus those without metronidazole. Secondary objectives include evaluating treatment appropriateness of diverticulitis and CDI per the Infectious Diseases Society of America (IDSA) treatment guidelines and assessing the clinical impact of CDI when it occurs. This multi-center, retrospective chart review evaluated patients who received at least 48 hours of antimicrobials for diverticulitis. HA-CDI rates were compared between regimens containing metronidazole and those without. The clinical impacts of CDI were assessed through length of stay, the necessity of surgical intervention, hemodynamic instability, or acute kidney injury incidence. Statistical analyses were conducted using descriptive statistics, unpaired t-tests, Mann-Whitney-U tests, and chi-squared tests. A total of 154 patients were included in the study population; 47 were excluded from the study and 107 were included in the study. HA-CDI incidence in the study population was 4.2% with appropriate treatment utilized appropriately 40% of the time. No association was found between HA-CDI incidence and antimicrobial class used ($p > 0.05$). Appropriate inpatient and discharge diverticulitis regimens were utilized 80.5% and 79.1% of the time, respectively, and treatment duration was appropriate 55% of the time. The incidence of HA-CDI in patients who received antimicrobial therapy for diverticulitis was minimal and irrespective of antimicrobial regimen. The majority of treatment regimens utilized acutely and at discharge was appropriate, though diverticulitis treatment duration and CDI treatment emerged as areas for improvement in the future.

Learning Objectives:

Recall risk factors associated with Clostridium difficile infection

Recognize appropriate antimicrobial regimens for diverticulitis

Self Assessment Questions:

Which of the following is thought to be a risk factor for developing CDI?

- A: Short-term antimicrobial use
- B: Chronic acid suppressant therapy
- C: Residence in an assisted living community
- D: Bmi <25

RD is an 85YOM admitted for CT-confirmed diverticulitis with perforation. He has no known drug allergies and CrCl 98 mL/min. Which would be an appropriate antimicrobial regimen in the inpatient setting?

- A: Ampicillin-sulbactam
- B: Amoxicillin-clavulanate
- C: Cefepime + metronidazole
- D: Cefazolin + metronidazole

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-542L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DESIGN AND IMPLEMENTATION OF A TECHNICIAN ADVANCEMENT PATHWAY

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Over the last five years, Froedtert & the Medical College of Wisconsin (FMCW) has seen technician responsibilities expand significantly. However, career advancement support has not met the needs of employees resulting in a 51% turnover rate among technicians within their first year of employment. Furthermore, The American Society of Health-System Pharmacists (ASHP) predicts a shortage of technicians in the near future. To combat these concerns, the ASHP Pharmacy Forecast 2017 recommends organizations develop technician career ladders to provide opportunities for growth and promote retention. The purpose of this project is to design and implement a technician advancement pathway in order to improve technician retention. The FMCW pharmacy enterprise identified the development of a technician advancement pathway (TAP) as a key strategic priority. A taskforce of stakeholders was formed including pharmacy leadership, pharmacy technicians and Human Resources representatives. The taskforce distributed an electronic survey to pharmacy technicians to determine interest in career advancement, and established cost of technician turnover utilizing workforce literature. Subsequently, the taskforce worked to design and implement TAP across all Froedtert practice settings and locations. Results of the technician survey ($n=96$) found that advancement opportunities are important to initial and continued employment for technicians, falling only behind pay. Furthermore, the majority of technicians stated that they were very or extremely interested in advancement opportunities within the department. Additionally, evaluation of the cost of turnover was found to be significant for the organization. The taskforce has worked to develop a technician advancement pathway incorporating job expectations, length of experience, and quality improvement involvement. Through this process, technician job descriptions were revised to align job expectations and advancement. Future work for the taskforce includes technician and leader education on the advancement process, and implementation of the pathway. Ongoing measurement of pharmacy technician turnover will be used to measure success.

Learning Objectives:

Describe key drivers for establishing a pharmacy technician career advancement pathway.

Identify critical stakeholders when developing a pharmacy technician career advancement pathway.

Self Assessment Questions:

Key drivers for developing a pharmacy technician advancement program include all of the following except:

- A: Expanded pharmacy technician roles and responsibilities
- B: High pharmacy technician turnover rates
- C: Pharmacy technician interest in career advancement
- D: State and federal regulatory requirements

Development of a pharmacy technician career advancement pathway should include all of the following stakeholders except:

- A: Pharmacy Leadership
- B: Pharmacy Technicians
- C: Patients
- D: Human Resource Partners

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-838L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

A RETROSPECTIVE ANALYSIS OF THE EFFECT OF DIABETES MELLITUS ON SUSTAINED VIROLOGIC RESPONSE IN PATIENTS TREATED WITH DIRECT-ACTING ORAL AGENTS

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Purpose: Hepatitis C is one of the common infections transmitted by blood in the United States. Historically, treatment of chronic hepatitis C has resulted in disease cure rates of 50-60% in the general population, and 20-30% among the Veteran population. Retrospective studies of peg-interferon and ribavirin-based regimens suggest that diabetic patients do not respond as well to these regimens. Within the past 5 years, multiple new medications, known as Direct-Acting Oral Agents (DAAs), have been FDA approved. DAAs work by targeting specific proteins that are essential for viral replication and proliferation. In clinical trials, the cure rate of DAAs were found to be greater than 90%. These recent clinical trials do not differentiate cure rates between patients with or without diabetes, however. The aim of this study is to assess whether diabetes and its level of control affects treatment outcomes in chronic hepatitis C patients who received treatment with a DAA. **Methods:** This study was conducted as a retrospective chart review of patients who received simeprevir, sofosbuvir, ledipasvir/sofosbuvir, elbasvir/grazoprevir, ombitasvir/paritaprevir/ritonavir/dasabuvir, or daclatasvir/sofosbuvir-based regimens. Patients who completed a full course of therapy with one of these treatment options will be electronically identified through the generation of a dispensed medication report. The study aim will be to analyze a maximum of 1000 patient charts to investigate its objective. Cure rates in patients with and without diabetes will be compared. The diabetes cohort will be subcategorized by the level of glycemic control to determine whether a difference in cure rate is identified between groups. **Results:** Research is currently ongoing; results are pending. **Conclusions:** Research is currently ongoing. Conclusions will be made after results are reported.

Learning Objectives:

Describe the association between diabetes mellitus and hepatitis C.
Identify the recent advancements in the treatment of Hepatitis C and how they have influenced cure rates.

Self Assessment Questions:

Which of the following is true regarding hepatitis C and diabetes mellitus?

- A It is very rare for them to be comorbid conditions
- B: Hepatitis C may increase the risk for development of diabetes mellitus
- C: Hepatitis C and diabetes mellitus are unrelated according to available data
- D: Diabetic patients may respond better to hepatitis C treatment than non-diabetic patients

Increasing the amount of data available to support the use of direct-acting oral agents in special populations is important for each of the following reasons except:

- A Treatments are costly
- B Treatment failure may spawn resistance, and decrease the likelihood of cure
- C Identification of modifiable risk factors for treatment failure will allow for better outcomes
- D Currently, their efficacy is not well-established. Further evidence is needed

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-553L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ESTABLISHING CLINICAL PHARMACY SERVICES FOR CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) IN A PRIMARY CARE SETTING AT A VETERANS AFFAIRS MEDICAL CENTER

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Purpose: Within the VA population, patients with COPD have significantly higher rates of all-cause and respiratory-related health care utilization than patients without COPD. Currently there are several VA sites that offer clinical pharmacy services in COPD management, but this service is not offered at the Richard L. Roudebush VA Medical Center. A recent study at this VA facility showed that with current standard of care, 16% of patients had a COPD exacerbation within one year. The goal of this project is to establish clinical pharmacy services for COPD in a primary care setting. **Methods:** To meet the study objectives, several steps must occur. Appropriate clinic structure and recruitment methods will be determined. Education will be developed for the clinical pharmacists and training sessions will be held. A COPD template will be created to utilize for scheduled appointments with patients. A protocol will be developed and approved by both pharmacy and medical staff to allow pharmacists to initiate, adjust, and appropriately monitor medications. The protocol will follow both the Global Initiative for Chronic Obstructive Lung Disease (GOLD) guidelines and VA/DoD Clinical Practice Guidelines. After approval, the protocol will be piloted in two primary care clinics. **Results and Conclusions:** Data and conclusions are pending and will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify the role of pharmacists in the management of COPD in a primary care setting

Discuss the updates to the Global Initiative for Chronic Obstructive Lung Disease (GOLD) guidelines and compare this to the VA/DoD Clinical Practice Guidelines for COPD

Self Assessment Questions:

All of the following are ways in which pharmacists can be involved in the management of COPD except:

- A Ensuring appropriate inhaler technique
- B: Recommending appropriate immunizations
- C: Performing spirometry in clinic
- D: Implementation of smoking cessation strategies

Per the GOLD guidelines, which of the following would be an appropriate initial inhaler regimen for a patient in GOLD Group C?

- A Albuterol
- B Tiotropium
- C Tiotropium/Olodaterol
- D Budesonide/formoterol

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-763L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ANTIMICROBIAL STEWARDSHIP IN A RURAL COMMUNITY HOSPITAL

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Purpose: Antibiotic use in the treatment of bacterial related infections has improved the health and wellbeing of countless patients. However, an estimated 20 to 50% of the antibiotics prescribed in hospitals are excessive and unwarranted and can lead to the growing problem of antibiotic resistance. In response to this problem, antimicrobial stewardship programs (ASPs) are being implemented in hospitals across the country to better manage antibiotic use. The purpose of this study is to compare the use of certain antibiotic agents before and after implementation of a protected formulary. **Methods:** Single center, combined retrospective and prospective, observational study on the impact of an ASP designed to monitor the use of protected antibiotics within the institution. Patients who are prescribed meropenem, ertapenem, daptomycin, linezolid or who are on piperacillin/tazobactam for greater than three days will be included. Data collection will consist of baseline demographics (including but not limited to sex, race, history of a multidrug-resistant organisms), the protected antibiotic ordered, antibiotic allergies, description of allergy (if available), prescriber, date and time prescriber contacted, positive culture, source of positive culture, kidney function measures (baseline and on day of order), antibiotic indication, rationale for selection, and result of attempted pharmacist intervention on antibiotic selection. Results to be reported include, appropriateness of initial antibiotic selection and prescriber acceptance of attempted pharmacist intervention. **Results and Conclusions:** This study is in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference pending data collection and analysis.

Learning Objectives:

Describe the primary goals of an Antimicrobial Stewardship Program (ASP).

Identify the new Joint Commission Antimicrobial Stewardship Standards

Self Assessment Questions:

What is the primary goal of an Antimicrobial Stewardship Program?

- A To reduce hospital costs
- B To maximize clinical outcomes while minimizing toxicity and resist
- C To create multidisciplinary teams within the hospitals
- D To improve the use of antimicrobials

Which of the following is part of the new Joint Commission Antimicrobial Stewardship Standards?

- A Establish a leader
- B Make sure you are choosing the most cost effective antibiotic
- C Must include CDC's Core Elements of Hospital's ASPs
- D Both A and C

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-439L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

COMPARISON OF MELPHALAN PRODUCTS IN MULTIPLE MYELOMA PATIENTS UNDERGOING AUTOLOGOUS STEM CELL TRANSPLANTATION

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Purpose: Upfront autologous stem cell transplantation with high-dose melphalan as the myeloablative conditioning regimen has been a cornerstone consolidation therapy for transplant-eligible multiple myeloma patients. There are currently two melphalan formulations - Alkeran (AMel) and Evomela (EMel)- available. AMel was the drug product used in most high-dose melphalan studies; however, this formulation poses operational challenges because it is stable for only one hour from the time of reconstitution. Conversely, while EMel has a 24-hour room temperature stability, the new drug products efficacy and safety has only been examined in bioequivalence studies. Melphalan was given as separate 100 mg/m² infusions on day -3 and -2 in those clinical trials, whereas it is often administered as a single 200 mg/m² infusion on day -1. Furthermore, our institution prepares the melphalan product as an undiluted 5 mg/mL solution while the package insert suggests to further dilute the reconstituted solution to a final concentration of 0.45 mg/mL. Therefore, more information is needed to validate whether a difference in preparation and administration techniques would produce the same clinical outcomes. **Methods:** Adult patients in the bone marrow transplant unit are enrolled in the study if they were diagnosed with multiple myeloma and received high-dose (at 200 or 140 mg/m²), undiluted AMel or EMel for myeloablation on day -1. Subjects are excluded if they had previously received allogeneic or autologous bone marrow transplant. Data will be collected via comprehensive medical chart review. The co-primary endpoints will evaluate the difference in median time to neutrophil and platelet engraftment between AMel and EMel. Secondary endpoints include median time to myeloablation, opioid use attributed to mucositis, diarrhea, nausea and vomiting, febrile neutropenia, infections, hospital length of stay, and 100-day treatment-related mortality. Two-sided students t-tests will be performed. Results are pending and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify common adverse effects associated with high-dose melphalan in the setting of autologous stem cell transplantation.

Explain the differences between the two available melphalan products.

Self Assessment Questions:

Which of the following is a common adverse effect of high-dose melphalan?

- A QTc prolongation
- B Mucositis
- C Cough
- D Hypertension

The propylene glycol-free formulation of melphalan is stable in room temperature for up to _____ hours.

- A 6
- B 12
- C 24
- D 48

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-524L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

COMPARISON OF RATE OF DELIRIUM FREE ICU DAYS BETWEEN PATIENTS RECEIVING MELATONIN PLUS TRAZODONE TO THOSE RECEIVING TRAZODONE ALONE

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Purpose: Patients in the intensive care unit (ICU) often experience sleep disturbance. Sleep disturbance in the ICU may be associated with an increased risk of delirium. Delirium prevention in the ICU is associated with increased six-month mortality and longer hospital length of stay. There is a dearth of evidence to support the role of pharmacologic sleep agents in prevention or treatment of ICU delirium. Literature suggests that in hospitalized patients, the pharmacologic agents melatonin and trazodone may increase sleep, and that trazodone may decrease delirium. The primary objective of this study is to compare the rate of delirium free ICU days in patients who received melatonin and trazodone to those who received trazodone alone.

Methods: This single center, retrospective chart review will include critically ill adult patients who received evening administration of trazodone alone or melatonin in addition to trazodone for at least 48 hours. Pregnant women, prisoners, patients with hepatic encephalopathy, traumatic brain injury, baseline dementia, or taking melatonin or trazodone prior to admission will be excluded. Calculation of rate of delirium free days will begin upon initiation of intervention and will be defined as number of delirium free days divided by total days of ICU admission. Secondary aims will include comparing administration of select medications, assessing patient characteristics associated with delirium, and evaluating associations among each cohort with patient outcomes (e.g., mechanical ventilation days; hospital and ICU length of stay; all-cause ICU and hospital mortality). Univariate and multivariate logistic regression will be performed to identify factors associated with and independent predictors for delirium free days. **Conclusion:** Data collection and analysis are ongoing.

Learning Objectives:

Review significance of sleep disturbance in the intensive care unit

Describe methods to minimize the risk of ICU delirium

Self Assessment Questions:

Which of the following is a cardinal feature of sleep deprivation?

- A: Inattention
- B: Disorganized thinking
- C: Disorientation
- D: Decreased ability to concentrate

Which of the following medications decreases REM sleep and increases ICU delirium?

- A: Lorazepam
- B: Melatonin
- C: Trazodone
- D: Quetiapine

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-597L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPROVING INTEGRATION OF CARE FOR PATIENTS WITH CHRONIC NON-CANCER PAIN IN PRIMARY CARE

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Statement of Purpose: The Centers for Disease Control and Prevention (CDC) supports that unintentional overdose deaths parallel per capita sales of opioid analgesics and are the leading cause of injury deaths in the United States.¹ Chronic opioid use may not always improve function and quality of life and increases risk of accidental overdose. 2-4 Factors which play into an increase in deaths and overdoses include substance use disorders, mental health diagnoses, certain comorbid conditions, and adverse events. Patients with risk factors can be identified using the Stratification Tool for Opioid Risk Mitigation (STORM) dashboard, which rates patients low, medium, high, or very high risk for suicide-related events, overdoses, falls, or accidents. Chronic non-cancer pain is best managed by a variety of modalities, including pharmacological, non-pharmacological, and psychological interventions. The purpose of this study is to improve integration of these modalities, especially that of mental healthcare. **Statement of Methods Used:** Eligible patients were identified from three primary care provider panels using the STORM dashboard. Chart reviews were completed for medium and above risk score patients with a primary care appointment within the next month. Information collected included patient risk factors, current medications, opioid dose, involvement with mental health treatment, and past mental health assessment scores. Review of the electronic prescription drug monitoring program was also completed. A note was placed in the patient chart and the primary care physician and integrated care psychologists were notified. Patients were contacted to coordinate an appointment with a psychologist the same day as the primary care visit. Retrospective chart reviews will be conducted identifying which patients successfully connected with integrated care. Secondary outcomes include integrated care visit outcomes, integrated care involvement in patients' pain care plan, and whether opioid tapers were initiated. **Summary of Results/Conclusions:** Twenty-one patients have been identified as medium and above STORM risk and have chart reviews completed. Full review pending.

Learning Objectives:

Describe factors which place patients with chronic non-cancer pain at higher risk of suicide or opioid overdose.

List challenges to integrating mental healthcare for chronic pain patients within primary care.

Self Assessment Questions:

Which of the following statements are true?

- A: Concomitant use of benzodiazepines, antidepressants, antipsychotics
- B: Disease state co-morbidities that place patients at higher risk of opioid use
- C: Morphine equivalent doses greater than 100 mg daily are a risk factor
- D: Not having a bowel regimen on board for a patient is a risk factor

Which of the following is considered a challenge to integrating care for chronic non-cancer pain patients in primary care?

- A: Not enough content to cover for a separate integrated care visit
- B: Patients having appointment scheduled when report is pulled
- C: Patient understanding the purpose of the integrated care visit
- D: Patients rescheduling primary care visits and integrated care visit

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-608L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

OPTIMIZING THE USE OF INFLIXIMAB FOR THE TREATMENT OF ACUTE SEVERE ULCERATIVE COLITIS

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Purpose: Ulcerative Colitis is a chronic condition characterized by diffuse mucosal inflammation limited to the rectum and colon. Hallmark symptoms include bloody diarrhea, abdominal cramping, and rectal urgency. Remission can often be induced and maintained with aminosalicylates, oral immunosuppressant medications or biologic agents; however, approximately 15% of patients will develop acute severe ulcerative colitis (ASUC) requiring hospitalization. Additionally, an estimated 30% of patients hospitalized for ASUC will undergo colectomy within 60 days of admission. During ASUC the goal of treatment is to prevent colectomy while inducing a corticosteroid-free histologic, endoscopic, and clinical remission. Standard infliximab doses of 5 mg/kg given at weeks 0, 2, and 6 for induction followed by maintenance doses every 8 weeks have proven effective for achieving clinical remission of UC. However, during ASUC exacerbations, several physiologic changes occur that may accelerate infliximab clearance including a higher TNF burden which is rapidly neutralized by standard doses of infliximab, excessive fecal elimination of anti-TNF biologics, and increased proteolytic degradation of infliximab by the reticuloendothelial system. Based on the pharmacokinetic properties of infliximab in ASUC, it is reasonable to expect that modified dosing strategies may be required to optimize efficacy. **Methods:** The primary objective of this retrospective cohort study is to evaluate 90-day colectomy rate in patients requiring hospitalization for ASUC that received standard dosing compared to an accelerated dosing regimen of infliximab. Accelerated dosing is defined as any dose given four days earlier than standard dosing frequency, employing a 10 mg/kg per dose strategy, or both. Secondary objectives include endoscopic, histologic, and clinical remission at 90 days, time to colectomy (if applicable), hospital acquired infections, occurrence of venous thromboembolism, and 30-day hospital readmission rates. To date, 40 patients meet inclusion criteria; however, it is too early in the data collection process to formulate any conclusions at this time.

Learning Objectives:

Recognize the physiologic changes that occur during acute severe ulcerative colitis that are presumed to accelerate infliximab clearance. Define accelerated dosing.

Self Assessment Questions:

Which of the following are physiologic changes presumed to accelerate infliximab clearance during acute severe ulcerative colitis?

- A Increased TNF burden
- B Excessive fecal elimination of infliximab
- C Increased proteolytic degradation of infliximab by the reticuloendothelial system
- D All of the above

Which of the following are included in the definition of accelerated dosing?

- A Any dose given four days earlier than standard dosing frequency
- B 7.5 mg/kg per dose
- C 10 mg/kg per dose
- D Both A & C

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-767L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

MEASURING STUDENTS KNOWLEDGE, SKILLS, AND ATTITUDES OF THE PHARMACISTS PATIENT CARE PROCESS IN AN INTERPROFESSIONAL SETTING

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Purpose: Doctor of Pharmacy students were evaluated on their knowledge, skills, and attitudes of the Pharmacists Patient Care Process (PPCP) with the goal of increasing awareness and performance of this process. This study also examines Doctor of Pharmacy and Master in Physicians Assistant students views on interprofessional learning with the goal of increasing awareness of the different professions roles.

Methods: Students in the second-year class at Sullivan University College of Pharmacy participated in a sequential case based simulation with students in the first-year class of the Master in Physicians Assistant program at Sullivan University. The students were placed together in teams and collected information, assessed, and created a plan for a simulated patient with diabetes. All students (90 Doctor of Pharmacy and 40 Physicians Assistant) were asked to complete a Readiness for Interprofessional Learning Scale (RIPLS) before and after each lab simulation session. Doctor of Pharmacy students were also asked to complete an additional survey assessing their knowledge, skills, and attitudes in regards to the PPCP. **Summary of Preliminary Results:** Survey response for the PPCP survey was 73.3% (pre-survey) and 53.3% (post-survey) and for the RIPLS was 90% (pre-survey) and 66.1% (post-survey). Students confidence in knowledge and understanding of the PPCP and their confidence in skills and abilities to successfully perform the PPCP improved following the activity ($P=0.02$, $P=0.01$, respectively). They increased their confidence in their skills and abilities to successfully assess information, plan, implement, and monitor/follow-up using the PPCP ($P=0.025$, $P=0.011$, $P=0.011$, $P=0.003$, respectively). After the activity was complete, more students felt learning with other students professionals would make them a more effective member of a health and social care team ($p<0.001$). **Conclusion:** Interprofessional education resulted in an overall positive effect of Doctor of Pharmacy students knowledge, skills, and attitudes toward the Pharmacists Patient Care Process.

Learning Objectives:

Discuss the Accreditation Council for Pharmacy Education standard addressing interprofessional education

Identify methods to incorporate interprofessional education in to the classroom and experiential learning

Self Assessment Questions:

Which of the following are key interprofessional team elements according to the ACPE standard for Doctor of Pharmacy programs involving interprofessional education?

- A Dynamics
- B Education
- C Practice
- D All of the above

The Pharmacists' Patient Care Process was developed to

- A guide pharmacists' patient care only in community practice
- B increase the number of recommendations pharmacist provide to patients
- C provide a framework for delivering patient care in any practice setting
- D decrease interprofessional collaboration

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-865L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PHARMACIST INTERVENTION OF ASYMPTOMATIC BACTERIURIA: AN ANTIMICROBIAL STEWARDSHIP PROGRAM

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Purpose: Asymptomatic bacteriuria is oftentimes inappropriately treated with antimicrobial therapy. Current guidelines and primary literature exhibit evidence supportive of recommendations to withhold antimicrobial therapy unless the patient is either pregnant or undergoing a urologic procedure. Despite the evidence to support withholding therapy, this condition is commonly mistreated leading to antimicrobial resistance, increased financial burden to the patient and the healthcare system, as well as unwanted adverse effects from the antimicrobial therapies selected. The objective of this study is to determine the impact of pharmacist intervention on management of antimicrobial therapy in patients with asymptomatic bacteriuria and urinary tract infections.

Methods: This is a prospective, interventional study with data collection via a 24 hour urinalysis report and chart review within an electronic health record. Patients who are admitted to a general medicine unit, on antimicrobial therapy and have a urinalysis analyzed within the past 24 hours will be included. The pharmacist will review the medical record for appropriateness of therapy and contact the physician with recommendations. The primary outcome is the proportion of inappropriate antimicrobial therapy to the number of successful pharmacist interventions. Types of interventions include discontinuation of therapy due to a lack of indication for treatment, placement of a stop date on appropriate therapy, de-escalation of therapy, discharge therapy recommendations and bug-drug mismatch. De-escalation is defined as narrowing antimicrobial coverage or transitioning the route from intravenous to oral. A secondary outcome of this study is the number of treatment days saved as a result of pharmacist intervention. Data points collected will include: medical record number, age, gender, antimicrobial agent and dose, presence of symptoms, urinalysis and urine culture results, source of infection and number and type of intervention. Results Data collection and analysis are currently in progress. Results and conclusions will be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Define asymptomatic bacteriuria and identify patients in which treatment is appropriate

Discuss the impact of pharmacist intervention on the treatment of asymptomatic bacteriuria and urinary tract infections in hospitalized patients

Self Assessment Questions:

Which populations is it appropriate to treat asymptomatic bacteriuria per the IDSA guidelines?

- A: Elderly women who reside in nursing homes
- B: Pregnant females
- C: Elderly males with diabetes
- D: Pre-menopausal, non-pregnant women

Which of the following are negative outcomes associated with treatment of asymptomatic bacteriuria?

- A: Increased healthcare cost
- B: Adverse effects from antimicrobial therapy such as clostridium diff
- C: Increased incidence of multi-drug resistant organisms
- D: All of the above

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-437L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF SUSPECTED GONORRHEA AND CHLAMYDIA INCIDENCE AND THE UTILIZATION OF EMPIRIC ANTIBIOTICS WITHIN A LARGE, ACADEMIC EMERGENCY DEPARTMENT SETTING.

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Purpose: In the Emergency Department (ED) patients are typically treated empirically for gonorrhea and chlamydia prior to confirmation of test results because of the extended time period it takes to receive these results. Recently, concern has been raised around antibiotic resistance patterns of *Neisseria gonorrhoeae*. Previous research has been conducted to address the concerns of overtreatment, undertreatment, and follow-up treatment success of management of chlamydia and gonorrhea and to help determine predictor variables of sexually transmitted diseases (STDs). However, to date, there have been limited studies evaluating the treatment of STDs in correlation with specific predictor variables in a clinical setting. This study aims to fill the gaps in literature regarding the evaluation of positive cultures and predictor variables. The objective is to determine the incidence of positive cultures in patients that receive chlamydia and gonorrhea screening in the ED.

Methods: The study is a retrospective cohort chart review approved by the Institutional Review Board at Cleveland Clinic Akron General (CCAG). All adult patients who presented to the ED between January 1, 2016 and December 31, 2016 with concern for an STD who received the gonorrhea and chlamydia screening titled BD ProbeTec ET Chlamydia trachomatis and *Neisseria gonorrhoeae* amplified DNA assays were identified. Subjects were excluded if they were victims of sexual assault since or if they were patients who left against medical advice (AMA) or eloped from the ED. The primary outcome is the incidence of positive cultures that patients received from the gonorrhea/chlamydia screening performed in the ED. The secondary outcomes include: the proportion of cultured patients treated empirically and of those patients with positive culture, the odds they had a risk factor. Results and conclusions:

Results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Review empiric treatment options for *Neisseria gonorrhoea* and *Chlamydia trachomatis*.

Identify risk factors of *Neisseria gonorrhoea* and *Chlamydia trachomatis*.

Self Assessment Questions:

Which of the following treatment options is an empiric treatment for *Neisseria gonorrhoea* and *Chlamydia trachomatis* in patients without any drug allergies:

- A: Ceftriaxone 250mg IV and azithromycin 1g oral once
- B: Ceftriaxone 250mg IM and azithromycin 1g oral once
- C: Ceftriaxone 250mg IM and azithromycin 2g oral once
- D: Azithromycin 2g oral once

The CDC currently lists which of the following patient population to be a risk factor for *Neisseria gonorrhoea* and *Chlamydia trachomatis*:

- A: Women > 25 years of age
- B: Men who have sex with men
- C: Number of sexual partners in a lifetime
- D: Previous or coexisting STDs

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-348L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

NON-ANTIMICROBIAL RENAL DOSING POLICY EVALUATION: A RETROSPECTIVE CHART REVIEW

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Background: Drug dosing errors are common in patients with renal impairment and can cause adverse effects and poor outcomes. Acute kidney injury and chronic kidney disease can slow the elimination and metabolism rates of the kidneys, causing medication accumulation. If unaddressed, this can result in changes in efficacy, increased adverse events, and nephro- or systemic toxicity. In June 2016, St. Vincent Hospital Indianapolis enacted a non-antimicrobial renal dose adjustment policy that permits pharmacist-driven medication dose adjustment per protocol based on an approved dosing nomogram. Senti7, an online medication monitoring program used by St. Vincent pharmacy staff, is utilized in collaboration with the protocol to generate alerts when a patient's calculated creatinine clearance has fallen within certain parameters indicating that a dosage adjustment may be necessary for certain medications. **Purpose:** The purpose of this study is to describe the rate of non-antimicrobial medication renal dose adjustments in eligible patients at St Vincent Indianapolis before and after implementation of a pharmacist-driven dosing protocol.

Methods: This retrospective chart review evaluated patient data generated from Senti7 before and after the implementation of the renal dose adjustment protocol. Department education regarding protocol implementation occurred between July and December 2016. Patients with alerts between January 1, 2016 and March 31, 2016 were included as the pre-intervention group. Patients with alerts between January 1, 2017 and March 31, 2017 were included as the post-intervention group. The rate of appropriate renal medication dose adjustment will be calculated in both groups. This rate will be compared between groups to determine the impact of the dose adjustment protocol implementation. **Results:** Results and conclusions to be presented at the Great Lakes Residency Conference.

Learning Objectives:

Discuss the importance of dose-adjusting medications based on renal function.

Describe the effectiveness of a non-antimicrobial renal dosing protocol implemented at St. Vincent Indianapolis Hospitals to increase the rate of appropriately renally-dosed medications.

Self Assessment Questions:

Based on FDA's Guidance for Industry, which equation is primarily used in clinical studies to adjust medication dosages based on renal function?

- A: Cockcroft Gault equation
- B: 24-hour urine output equation
- C: CKD-EPI equation
- D: Reetze-Bonorden equation

Enoxaparin is one example of a drug that should be adjusted based on renal function. Why should enoxaparin be dose-adjusted based on patient's renal function?

- A: Enoxaparin is metabolized more rapidly in patients with chronic kidney disease
- B: Decreased drug elimination through the kidneys can result in increased enoxaparin levels
- C: Enoxaparin's reuptake is doubled in patients with chronic kidney disease
- D: The kidneys' production of aldosterone is increased in chronic kidney disease

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-466L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

TARGETED INTERVENTIONS FOR IMPROVING TIME IN THERAPEUTIC RANGE IN A PHARMACIST-RUN ANTICOAGULATION CLINIC

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Purpose: International normalized ratio (INR) is utilized to assess therapy with warfarin. INR time in therapeutic range (TTR) is important for both safety and efficacy of warfarin therapy. At the Richard L. Roudebush VA Medical Center Anticoagulation Clinic, TTR is evaluated each quarter with a goal clinic TTR of 60% or greater. Although the clinic has met this goal, there are a number of veterans still spending a significant time outside of therapeutic range. This places them at increased risk for complications including stroke, thromboembolism, and major bleeding. The purpose of this project is to identify and implement targeted interventions to improve TTR for individual veterans, as well as to improve the overall anticoagulation clinic TTR. **Methods:** A list of patients with TTR < 20% for the quarter of April 1 to June 30, 2016 was developed and divided amongst the clinical pharmacy specialists at the Richard L. Roudebush VA Medical Center Anticoagulation Clinic. Pharmacists were responsible for reviewing and implementing specific interventions for these patients from the time period of October 1 to December 31, 2016. All interventions were documented in a spreadsheet and the patient chart. At the conclusion of this period, the TTR for the entire clinic and the number and type of interventions were evaluated for impact. A subsequent period of intervention is underway with pharmacists reviewing patients with a TTR < 20% from July 1 to September 30, 2016. **Results:** From April 1 to June 30, 2016, 63 patients were identified with a TTR < 20% and all patients were reviewed. A variety of interventions were implemented including conversion to a direct oral anticoagulant (DOAC) and discontinuation of warfarin. Additional results will be presented at the Great Lakes Pharmacy Residency Conference. **Conclusions:** Conclusions to be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the Rosendaal Method for calculating time in therapeutic range (TTR), as well as the limitations of the calculation.

Identify potential interventions to improve time in therapeutic range for individual veterans.

Self Assessment Questions:

Which of the following is true of the Rosendaal Method of calculating TTR:

- A: It is an average of all measured INR values within a specified time
- B: It assumes a linear relationship between INR measurements
- C: It is an exact evaluation of INR values
- D: It can be utilized with a single INR measurement

Which of the following is a listed exclusion criteria on the VA criteria for use for direct oral anticoagulant utilization:

- A: Serum creatinine of >2.0
- B: Minor liver dysfunction
- C: Clinically significant valvular disease
- D: History of endocarditis

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-554L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ASSESSMENT OF DOCUMENTED INTERVENTIONS IN A REQUIRED INPATIENT GENERALIST ADVANCED PHARMACY PRACTICE EXPERIENCE (APPE) PROGRAM AT AN ACADEMIC MEDICAL CENTER.

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Purpose: Training student pharmacists requires significant time investment by preceptors. However, student pharmacists can contribute

to productivity and patient care activities by effectively incorporating them into pharmacy practice models under supervision of pharmacist preceptors. A required Inpatient Generalist APPE rotation was developed to provide a valuable educational experience while

incorporating student pharmacists into the practice model to support and expand pharmacist patient care services. Limited data exist

quantifying the benefit student pharmacists can have on overall provision and documentation of patient care services provided by

pharmacists. The objective of this study is to assess the impact of incorporating student pharmacists into a required generalist

pharmacist APPE rotation on documentation of pharmacist patient care services and interventions. Methods: This is a retrospective, observational study conducted at University of Michigan Hospital. Generalist pharmacists who served as preceptors for a 5-week APPE rotation were identified. The total number of documented patient care notes and interventions for each pharmacist were evaluated during two randomly-selected 5-week intervals: when pharmacists served as a preceptor for a student and when a pharmacist provided services without a student. The primary outcome measures the average number of documented notes between these two periods. Secondary outcomes include the number and type of patient care interventions documented by clinical pharmacist generalists while serving as a preceptor (pharmacist + APPE student) compared to a similar time frame while not serving as a preceptor. Continuous variables will be compared using a paired Student's t-test (normally-distributed data) or Mann-Whitney U (non-parametric data). Ordinal variables will be compared using Chi-square or Fisher's Exact test. Statistical significance will be considered at a p-value of < 0.05 . Results: Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Explain the current state of research in the impact of student pharmacist while on rotation at a medical center.

Recognize potential opportunities where students can contribute to patient care at a medical center.

Self Assessment Questions:

The impact of student-pharmacists in an inpatient medical center during rotation:

- A provide a major benefit to pharmacy services
- B: appears positive, but difficult to determine given the few studies
- C: is negligible in larger medical centers
- D: is directly proportional to preceptor involvement with the student

Student-pharmacists may contribute to patient care at a medical center by:

- A discovering drug interactions
- B dose-adjusting medications
- C verifying medications ordered by the physician
- D A and B

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-866L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF A COMPREHENSIVE MEDICATION THERAPY MANAGEMENT MODEL WITHIN AN OUTPATIENT PHARMACY DEPARTMENT OF A PEDIATRIC HOSPITAL AFFILIATED WITH AN ACCOUNTABLE CARE ORGANIZATION

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Purpose: The objectives of this study are to (1) describe the implementation of a comprehensive medication therapy management (MTM) model, (2) analyze the clinical impact of interventions following implementation of this model, and (3) quantify the financial impact associated with targeted interventions and comprehensive medication reviews. Methods: This project is a single-center prospective, interventional study conducted within an outpatient pharmacy department of a pediatric hospital affiliated with an accountable care organization (ACO) that has the opportunity to provide medication therapy management services for participating managed-Medicaid health plans. The community care pharmacy practice resident, in coordination with pharmacists from administration and the ACO, has developed a comprehensive MTM model to be utilized by the outpatient pharmacy department. The outpatient pharmacy department includes outpatient pharmacies and ambulatory clinics in which clinical pharmacists are embedded. The comprehensive MTM model incorporates training sessions and pharmacy workflow procedures to be utilized by outpatient pharmacists and ambulatory clinical pharmacists to collaboratively provide MTM services. A subjective assessment of the MTM model will occur through anonymous surveys completed by pharmacists, pharmacy interns, and pharmacy technicians at one, two, and three months post-implementation. An objective assessment of the MTM model will occur through utilizing data resources to analyze clinical impact and quantify financial impact of MTM interventions.

Results/Conclusion: Data collection and analysis are ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify the advantages of providing medication therapy management services

Discuss the barriers to implementing a comprehensive medication therapy management model

Self Assessment Questions:

What benefits can be attributed to providing medication therapy management services?

- A Empowerment for patients to optimize their medication use
- B: Improvement in collaboration amongst health care providers
- C: Enhancement of communication between patients and their health
- D: All of the above

What are the required components of a comprehensive medication review?

- A Patient Agreement Contract (PAC)
- B Medication Action Plan (MAP)
- C Prescriber Consultation Request (PCR)
- D Cost-Effectiveness Evaluation (CEE)

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-384L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

RISK FACTORS FOR CLOFARABINE HEPATOTOXICITY IN PATIENTS WITH ACUTE LEUKEMIA

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Background: Relapsed/refractory acute myeloid leukemia (AML) and acute lymphoid leukemia (ALL) are associated with an extremely poor prognosis. The majority of patients with AML or ALL are greater than 60 years of age and have higher rates of comorbidities and organ dysfunction as well as lower rates and shorter duration of complete remission and increased early mortality. Thus, novel therapies are urgently needed that are effective and less toxic to help achieve and maintain remission since standard intensive chemotherapy is associated with poor outcomes. Clofarabine is a second-generation purine analogue with significant activity against both ribonucleotide reductase and DNA polymerase. Unique compared to other purine analogue therapies, clofarabine also directly affects mitochondrial transmembrane potential and releases cytochrome c, leading to apoptosis via the apoptosome pathway in leukemia cells. However, its use is limited by toxicities, in particular severe hepatotoxicity. Currently there is limited data examining risk factors for clofarabine hepatotoxicity. **Objective:** The primary objective of this study is to identify risk factors for clofarabine hepatotoxicity in order to optimize therapy in acute leukemia patients. **Methods:** This study is a single-center, retrospective, case control study of adult patients with acute leukemia at UMHS who received clofarabine for remission induction from January 2010 to September 2016. The following data will be collected: demographic (age, gender, weight, BSA, type of leukemia), laboratory (Scr, LDH, AST/ALT, bilirubin, alkaline phosphatase, albumin, INR, aPTT, CBC), other (dose of clofarabine, current chemotherapy regimen, stem cell transplant history, concomitant hepatotoxic drugs). The primary outcome will look at the proportion of patients that developed hepatotoxicity and to what degree. Secondary outcomes will include complete remission rate, event free survival, overall survival, and proportion of patients able to receive subsequent consolidative chemotherapy or allogeneic stem cell transplant. **Results/Conclusion:** Results and conclusions will be presented at Great Lakes.

Learning Objectives:

Review the mechanism of action and place in therapy of clofarabine
Discuss the adverse effects of clofarabine

Self Assessment Questions:

What is the mechanism of action of clofarabine?

- A After phosphorylation, it is incorporated into DNA and inhibits DNA
- B Direct binding to DNA (intercalation) and inhibition of DNA repair (I
- C Active against ribonucleotide reductase and DNA polymerase while
- D Inhibits DNA synthesis through gaining entry into cells by a carrier

Which of the following is an adverse effect of clofarabine?

- A Hepatotoxicity
- B Nephrotoxicity
- C Pulmonary toxicity
- D Cardiotoxicity

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-425L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EXPLORING METHODS OF IMPLEMENTING DECISION SUPPORT TOOLS IN A TEACHING HOSPITALS ELECTRONIC HEALTH RECORD

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Purpose: Implementation strategies are key in changing and sustaining healthcare practices. This is especially true in teaching institutions as medical residents turn over yearly. To aid in prescribing efforts, many institutions create decision support tools (DST) in their electronic health record. In theory, these tools allow for greater accuracy and consistency in decision making. Their use and effectiveness lies in clinician knowledge of and attitude toward these tools. Understanding these attitudes can aid in their integration and use. In 2014-15, our institution implemented a pneumonia DST. Education on the DST was provided to internal medicine residents from November 2015 to March 2016. Although effective, only one-third of antibiotic orders for pneumonia treatment from December 2015 to March 2016 utilized the DST. Of those who used the tool vs. those who didn't, 85.7% vs 68.9% appropriately classified the pneumonia by type and 52.4% vs 17.2% chose appropriate empiric antimicrobials as recommended by the DST, respectively. Based on these findings, it is possible that increased use of the DST may result in increased accuracy of classification and appropriateness of empiric treatment of pneumonia at our hospital. The purpose of this study is to elucidate prescriber attitudes, barriers to use, and effective educational methods of the pneumonia DST to inform future DST implementation efforts at our institution. **Methods:** This is a qualitative analysis using surveys to elucidate prescriber attitudes toward an existing DST. Surveys were administered to a random selection of internal medicine residents through email and during morning report from December 2016 to January 2017. Our primary objective was to determine common attitudes surrounding use of the tool. Secondary objectives were to determine how residents learned about the tool and to detect obstacles that impeded its use.

Results/Conclusions: This study is in progress. Results will be presented at the Great Lakes Conference.

Learning Objectives:

Discuss the importance of implementation strategies and their impact on medical decision making.
Identify steps to take when implementing decision support tools.

Self Assessment Questions:

By what percentage did appropriate antimicrobial selection increase after using the pneumonia decision support tool?

- A 5%
- B 15%
- C 35%
- D 55%

According to the article "Advancing clinical decision support" by Byrne et al, what is the first step to implementing a new decision support tool?

- A Perform a workflow analysis
- B Assess readiness of stakeholders
- C Assemble the implementation team
- D Communicate goals and involve stakeholders

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-619L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

WEIGHING THE RISKS OF BLEEDING VERSUS THROMBOSIS IN LIVER TRANSPLANT AND THE TIME TO EVENT

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Background: Postoperative hemostatic instability events, such as bleeding or thrombi, after liver transplant can lead to corrective surgery, second transplants, or death. Risk factors for bleeding and thrombosis are poorly defined in liver transplant leading to varying practice. Applicability of previous studies to the transplant population is questionable and practitioners are reluctant to change practice without further investigation. The hypothesis for this study is that the incidence of bleeding combined with the historical belief that patients are "autoanticoagulated" after liver transplant has prevented thromboprophylaxis administration to patients who are at risk of developing thrombi. Results will be used in the development of a thromboprophylaxis protocol for liver transplant patients for use in future studies. **Methods and Design:** A retrospective chart review of liver transplants from 04/01/2012 to 11/01/16 will be performed. Patients who received a liver transplant at least four months prior to the start of data collection and were 18 years or older at time of transplant are included. Any patient with active bleeding reported within one week prior to transplant or receiving multi-visceral transplant including a portion of bowel will be excluded. Data will be collected at time of transplant and at 100 day follow up including MELD score, hemoglobin, gender, weight age, creatinine clearance, previous thrombi, history of malignancy, indication and type of transplant, prescribed thromboprophylaxis, time to event, graft and patient survival. Bleeds will be defined by the International Study Group of Liver Surgery criteria grade B or higher. Patients that experience a hemorrhagic or thrombotic event will be compared to those that do not. Secondary analysis will be performed to determine risk factors, including thromboprophylaxis, for bleeds and thrombi in the IUH patient population. **Results:** Data collection and analysis is ongoing and will be presented at Great Lakes Residency Conference.

Learning Objectives:

Recognize the coagulopathies that complicate the use of thromboprophylaxis in liver transplant patients

Review previous trial outcomes related to bleeds and thrombi after liver transplant

Self Assessment Questions:

Compared to the general surgery population, liver transplant recipients are

- A Less likely to bleed and less likely to clot
- B: Less likely to bleed and more likely to clot
- C: More likely to bleed and less likely to clot
- D: More likely to bleed and more likely to clot

Pre-transplant deficiency of which factor produced by the liver has been associated with post-operative thrombosis?

- A Factor II
- B Factor V
- C Protein α
- D Protein C

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-600L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTING A WORK-FLOW REDESIGN AT THE ZABLOCKI VA MEDICAL CENTER FOR PATIENT ALIGNED CARE TEAM (PACT) PHARMACIST SERVICES TO INCREASE ACCESS TO CARE.

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Purpose: In 2015, the Madison VA Hospital streamlined their primary care services to better utilize all healthcare professionals within the PACT model. Their initiative transitioned 27% of all primary care appointments away from primary care providers. This resulted in 850 new provider appointments per quarter at the Madison VA. The purpose of this project is to help redesign workflow for pharmacists at the Zablocki VA Medical Center to increase pharmacist disease state management and achieve increased access to pharmacist and primary care provider appointments for veterans. **Methods:** This project will provide the necessary education for implementation, and work needed for work-flow redesign of current PACT pharmacist services. Pharmacist education will consist of in-services that will focus on common PACT chronic disease states. Pre and post surveys will be utilized following chronic disease state in-services to determine pharmacist comfort and ability to manage the disease state appropriately. Provider education will be completed to help raise awareness of the pharmacists role as a midlevel provider within the PACT team in an effort to increase the number of PACT PharmD consults. Evaluation of current PACT PharmD scheduling panels will also be completed to recommend changes for implementation. **Results:** Data collection is in progress, and final results and conclusions will be presented at the 2017 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the role of a pharmacist within the VA PACT model of care and their direct impact on patient care.

Identify potential strategies employed to allow for work flow redesign at the Clement J. Zablocki VA Medical Center.

Self Assessment Questions:

What does PACT stand for?

- A Pharmacist assigned care team
- B: Physician arranged care team
- C: Patient aligned care team
- D: Patient accepted care team

Within the PACT model of care at the VA a pharmacist has the ability to do which of the following?

- A Change a dose of a medication that is specific to the disease state
- B Order labs for a patient that relate to the specific disease state
- C Initiate a new medication for a patient that is specific to the disease
- D All of the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-836L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

AN OPT-OUT APPROACH TO ANTIMICROBIAL STEWARDSHIP UTILIZING ELECTRONIC ALERT RECOMMENDATIONS AT A COMMUNITY HOSPITAL

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Background:

Prospective audit and feedback has been shown to improve antimicrobial utilization but can be limited by barriers in communication and provider non-participation. Traditionally prospective audit and feedback has been an opt-in process. In order to address provider non-participation, an opt-out approach may be needed. An opt-out program utilizing electronic alerts to deliver recommendations to de-escalate, discontinue, or change antibiotics was piloted at Norton Audubon Hospital. Recommendations were implemented per protocol if no provider rejected them after 24 hours. The purpose of this study is to describe the experience of an opt-out antimicrobial stewardship pilot program.

Methods:

This is a retrospective observational study on the frequency of accepted recommendations at Norton Audubon Hospital from January 6th, 2016 to March 31st, 2016. Accepted recommendations include those that were accepted as is, accepted with modification, and accepted per protocol. Recommendation responses are further categorized by recommendation type, day of antimicrobial therapy, current antimicrobials, provider specialty, and clinical reasoning for recommendation. Secondary outcomes examine the impact of opt-out antimicrobial stewardship on antimicrobial days of therapy and healthcare facility-onset *C. difficile* infection rates.

Results & Conclusion:

Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference

Learning Objectives:

Identify barriers to prospective audit and feedback.

List necessary elements needed for successful implementation of opt-out stewardship to reduce broad-spectrum antibiotic utilization

Self Assessment Questions:

Which of the following is a barrier to prospective audit and feedback?

- A: Delays in communication
- B: Emergence of bacterial resistance
- C: Increased risk of adverse events
- D: Increase in antimicrobial utilization

Which of the following is a necessary element needed to implement opt-out antimicrobial stewardship to reduce usage of broad-spectrum antimicrobials?

- A: IV to PO automatic interchange protocols
- B: Antimicrobial renal dose adjustment protocols
- C: Advanced trained personnel in infectious diseases
- D: Restricted antimicrobial approval process

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

THE EFFECT OF OBESITY ON VANCOMYCIN SERUM CONCENTRATIONS IN ADULT PATIENTS RECEIVING CONTINUOUS VENOVENOUS HEMOFILTRATION (CVVH)

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The purpose of this study is to investigate if the proportion of patients attaining target vancomycin trough concentration differs in critically ill, obese patients receiving continuous venovenous hemofiltration (CVVH) compared with non-obese patients. Vancomycin is a mainstay antibiotic for treatment of gram-positive organisms. To ensure maximal efficacy and safety, appropriate dosing and therapeutic drug monitoring is required. A trough concentration of 15-20 mcg/ml is commonly targeted, as it has been associated with a lower rate of treatment failure in patients with MRSA infections. In critically ill patients, several pathophysiological changes occur that must be considered when dosing this antibiotic. Some of these changes include vasodilation, end-organ damage, hypoalbuminemia, and use of renal replacement therapy. The increasing prevalence of obesity in the United States further complicates dosing. Presently, there are no vancomycin studies evaluating dosing requirements in critically ill, obese patients receiving CVVH. This is a retrospective cohort study of patients admitted to an ICU at Rush University Medical Center (RUMC) from January 1, 2013 to July 1, 2016. Patients will be included in this study if they are ≥ 18 years of age, received at least 48 hours of vancomycin therapy while on CVVH, have a trough drawn prior to the 3rd or 4th dose, and adhered to the current RUMC vancomycin dosing guidelines. Patients who were pregnant, diagnosed with cystic fibrosis, received other forms of renal replacement therapy, had a urine output of ≥ 0.5 ml/kg/hr, or had received extracorporeal membrane oxygenation at any time will be excluded. The primary outcome is the proportion of patients achieving a target vancomycin trough concentration defined as 15-20 mcg/ml prior to the 3rd or 4th dose. The Chi Square or Fishers Exact Test will be used to determine if this outcome significantly differs between obese (BMI ≥ 30 kg/m²) and non-obese (BMI < 30 kg/m²) patients.

Learning Objectives:

Identify changes in critically ill patients that may alter vancomycin pharmacokinetics

List potential vancomycin pharmacokinetic changes in obesity

Self Assessment Questions:

All of the following may alter vancomycin pharmacokinetics in a critically ill patient except:

- A: Septic shock
- B: Cirrhosis
- C: Use of CVVH
- D: Neutropenia

All of the following vancomycin pharmacokinetic changes are likely to occur in obesity except:

- A: Increased volume of distribution
- B: Increase free fraction of drug
- C: Increased clearance
- D: Decreased volume of distribution

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-537L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

VANCOMYCIN PHARMACOKINETICS IN PATIENTS WITH BACTERIAL MENINGITIS

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Purpose: Vancomycin is a component of all first-line recommended regimens for empiric treatment of suspected bacterial meningitis. There are no data available that investigate potential variations in vancomycin pharmacokinetics in patients with bacterial meningitis, however there is evidence to suggest that these patients are at risk for enhanced renal elimination and are unable to achieve target concentrations of renally-cleared antibiotics. The purpose of this study is to evaluate the pharmacokinetic characteristics of vancomycin in patients with bacterial meningitis. Expected results will contribute to the current pharmacokinetic literature available on vancomycin. Data obtained may support future antibiotic management strategies in patients with bacterial meningitis. **Methods:** This is a retrospective chart review including patients with confirmed bacterial meningitis ≥ 18 years of age who received at least 3 doses of vancomycin therapy with at least one steady state trough concentration. Patients with diagnosed chronic kidney disease stages 3-5, CrCl < 60 ml/min at the time of vancomycin initiation, body mass index < 18 kg/m², history of nephrectomy, renal replacement therapy during vancomycin study period, or who are pregnant, lactating or incarcerated will be excluded. The primary objective will be comparing the predicted pharmacokinetic parameters using population-based equations to patient-specific parameters calculated from measured steady-state serum concentrations. As a secondary objective, the differences among patients with and without a subtherapeutic vancomycin trough will be evaluated, such as vancomycin dosing regimen, creatinine clearance, severity of illness, comorbid neurologic diseases, and concomitant medications. **Conclusions:** The final results and conclusions of this study are pending and will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify the rationale for inclusion of vancomycin for empiric treatment of community-acquired bacterial meningitis

State the target vancomycin trough concentration for meningitis according to IDSA national guideline and consensus statement from IDSA, ASHP, IDSA, and SIDP

Self Assessment Questions:

Vancomycin is recommended in suspected or confirmed community-acquired bacterial meningitis to cover empirically for which pathogen?

- A: Methicillin-susceptible *Staphylococcus aureus*
- B: Methicillin-resistant *Staphylococcus aureus*
- C: Coagulase-negative staphylococci
- D: *Streptococcus pneumoniae*

According to IDSA's Practice Guideline for Bacterial Meningitis, what is the target steady-state trough concentration of vancomycin in empiric treatment of bacterial meningitis?

- A: 0-5 mcg/mL
- B: 5-10 mcg/mL
- C: 15-20 mcg/mL
- D: 20-25 mcg/mL

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-564L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ESTABLISHING A DRUG INTENSITY INDEX (DI2) TO TRACK AND PROJECT FUTURE DRUG EXPENSES

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Purpose: The purpose of this project is to develop and validate an innovative Drug Intensity Index (DI2) financial model that more accurately forecasts pharmacy drug expenses and variations for the purpose of predictive analytics. Other literature has attempted to utilize models that have applied data from a variety of databases including, CMS and Truven Health Analytics. However, these models have shown that the predictive costs when compared to actual costs can vary from 25 to 374% and thus providing a need to construct a more accurate model. By creating a new pharmacy specific drug expenses prediction model, UMHS will understand drug expenses for our patient population allowing predictive analytics to monitor medication expenses over time. **Methods:** Through the electronic medical record (EHR), patient specific data used in predicting total medication cost was extracted. Data over a two-year period will be collected and includes all discharged patients assigned a diagnosis related grouping (DRG), medication dose administration, medication cost, total medications per patient, total doses per patient, and other patient specific data that will be identified as variables that could correlate with medication cost. Our statistical analysis will be determined by linear regression that uses patient mix indicators as independent variables to predict total medication cost. To account for drug cost variation and inflation over the two-year period, we will use the Peterson-Kaiser Health System Tracker projections. With the regression model, we will use the means of patient specific data used at the independent variables to predict the medication cost for a six-month period. We will utilize incorporate institution specific initiatives and goals to make adjustments to our inputs that could reflect possible future medication costs. A comparison of our cost prediction and actual cost data will be compared to validate the model. **Results:** Results and conclusions will be presented at Great Lakes.

Learning Objectives:

Discuss previous models and approaches in predicting medication costs and their strengths and limitations

Describe the rationale for developing a more accurate medication expense forecasting model and potential impacts on the pharmacy department budget

Self Assessment Questions:

Which of the following has historically been a more accurate measure for predicting medication expense?

- A: Case Mix Index (CMI)
- B: Pharmacy Intensity Score (PIS)
- C: Patient days
- D: All of the above are equally accurate for predicting medication expense

Which of the following is based on "overall" resource consumption?

- A: Pharmacy Intensity Weight (PIW)
- B: Pharmacy Intensity Score (PIS)
- C: Case Mix Index (CMI)
- D: Diagnosis Related Grouping (DRG)

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-872L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PHARMACIST-DRIVEN ANTICOAGULATION OPTIMIZATION IN THE AMBULATORY SETTING

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Purpose: Patients anticoagulated on the vitamin K antagonist warfarin require intensive monitoring. Time in Therapeutic Range (TTR) is the percent of time patients spend within their goal INR range and is used as a standard quality measure of warfarin management. A low TTR is indicative of poor anticoagulation control, which is associated with an increased risk of thromboembolic or bleeding events. This study was completed to determine if pharmacist-driven intervention can meaningfully improve the TTRs in a community hospital-based anticoagulation clinic. **Methods:** To be included in this study patients had to be at least 18 years of age and on warfarin for at least 3 months. The TTR of each active patient was calculated by CoagClinic at two ambulatory care pharmacist-lead anticoagulation clinics between September 1, 2015 to September 1, 2016. Patients with a TTR of less than 50% were provided warfarin re-education that included a description of TTR, the patient's own TTR, and strategies to improve TTR. In addition, patients with sub-optimal TTRs were also evaluated for appropriateness of continued anticoagulation or eligibility for a change to a direct oral anticoagulant. Change in TTR for each patient as well as the overall clinic TTR will be assessed to determine if a meaningful increase is seen following intervention. **Preliminary Results and Conclusions:** This study is ongoing and final results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference in April 2017.

Learning Objectives:

Define Time-in-Therapeutic Range

Identify the minimum percent Time-in-Therapeutic Range required for patients to have "good" control of their warfarin therapy

Self Assessment Questions:

Time-in-Therapeutic Range is defined as:

- A the percent of time a patient is within their goal INR range.
- B the patient's mean INR.
- C the percent of INR's within the goal INR range.
- D the total number of INR's within the goal INR range.

Patients considered to have "good" control of their warfarin therapy have a Time-in-Therapeutic Range of greater than:

- A 85%
- B 60%
- C 50%
- D 75%

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-501L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PLATELET REACTIVITY AND INCIDENCE OF BLEEDING IN PATIENTS ON P2Y12 RECEPTOR ANTAGONISTS UNDERGOING CORONARY ARTERY BYPASS GRAFTING

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Purpose: Fifteen percent of patients requiring coronary artery bypass grafting (CABG) will be on dual antiplatelet therapy (DAPT) for the prevention of ischemic cardiovascular events. While preoperative P2Y12 receptor inhibition has been associated with a reduction in the risk of ischemic events, recent exposure to P2Y12 inhibitors prior to surgery has been associated with an increased risk of bleeding. To decrease the risk of bleeding, the ACCF/AHA Guidelines for Unstable Angina/Non-ST Elevation Myocardial Infarction recommend discontinuation of clopidogrel and ticagrelor 5 days prior to surgery. Due to significant response variability with P2Y12 receptors, the Society of Thoracic Surgeons recommend timing surgical intervention based on platelet function tests. Despite this recommendation, the validity of these assays as well as optimal cutoff of platelet reactivity prior to surgery remains elusive. The purpose of this study is to determine if there is a difference in bleeding in patients that discontinue clopidogrel or ticagrelor 5 days prior to surgery versus platelet reactivity as determined by a platelet function assay. **Methods:** A Retrospective cohort study from January 2013 to December 2016 was conducted including patients previously on clopidogrel or ticagrelor that underwent a CABG at Northwestern Memorial Hospital. The primary outcome was postoperative bleeding defined by BARC-4 criteria. Data collected included time of P2Y12 inhibitor discontinuation, perioperative hemoglobin levels, time on bypass, perioperative blood transfusions, redo sternotomy, 24 hour chest tube output and intracranial hemorrhage. Patients who discontinued clopidogrel or ticagrelor 5 days prior to CABG were compared to patients who underwent CABG based on normalized platelet function assay as defined by <194 platelet reactivity units with the VerifyNow Assay. Secondary endpoints include timing (days) to surgery, intraoperative blood product utilization. **Results/Conclusion:** To be presented at the Great Lakes Pharmacy Resident Conference

Learning Objectives:

Discuss the importance of antiplatelet therapy in the prevention of ischemic cardiovascular events

Review recommendations for discontinuation of antiplatelet therapy prior to cardiovascular surgery

Self Assessment Questions:

1. What is the recommended time period to discontinue ticagrelor or clopidogrel prior to a patient undergoing a CABG procedure?

- A Immediately
- B 3 Days
- C 5 Days
- D 7 Days

2. Which of the following describe a common mechanism for variable platelet response with clopidogrel among surgical candidates?

- A CYP2C19 polymorphism
- B Dietary Lifestyle
- C Active Infection
- D Chronic Kidney Disease

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-679L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DECREASING READMISSIONS IN OUTPATIENT PARENTERAL ANTIMICROBIAL THERAPY (DROP IT)

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Purpose: Outpatient Antimicrobial Therapy (OPAT) has been shown to have similar clinical outcomes to therapy completed in the inpatient setting with an overall clinical success rate above 85%. However, there are also complications associated with OPAT including early termination and adverse drug reactions. Up to 25% of patients discharged with OPAT are readmitted and approximately 70% of those readmissions are directly related to OPAT. A preliminary, retrospective, single center study at the University of Cincinnati Medical Center (UCMC) revealed a 90-day OPAT-related readmission rate of 33%. An OPAT bundle has been proposed in literature to reduce therapy-related readmissions and advance care for these patients. In order to identify opportunities for improvement at UCMC, a failure modes and effects analysis was conducted and an interprofessional bundle strategy is currently being implemented. **Methods:** This retrospective, single center study will evaluate patients that have been diagnosed with an infectious process and subsequently discharged with intravenous antibiotics for at least one week. Patients will be divided into pre-OPAT bundle or post-OPAT bundle with readmission or no readmission. A chi square will be utilized to determine difference in readmission rate among the pre- and post-bundle groups. Multivariate logistic regression will be performed to identify factors associated with readmission in the post-bundle groups (e.g.: antibiotics used, duration of therapy, monitoring recommendations etc.). Significant variables identified on univariate analysis will be included in the multivariate logistic regression. Completion rates for the bundle components will be reported as descriptive statistics and tracked longitudinally throughout the study. **Results and Conclusion:** Data collection and analysis is ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the rationale for utilization of an Outpatient Parenteral Antimicrobial Therapy (OPAT) bundle

Describe the strategies utilized in a large-scale healthcare process improvement initiative

Self Assessment Questions:

Which part of the Plan/Do/Study/Act model for process improvement involves continual reassessment of the outcomes of a process?

- A Plan
- B Do
- C Study
- D Act

What should a healthcare bundle look like?

- A Rigid, unchanging model with 10-20 components
- B Rigid, unchanging model with 3-6 components
- C Flexible, evolving model with 10-20 components
- D Flexible, evolving model with 3-6 components

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-778L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACTING ANTIMICROBIAL STEWARDSHIP IN A COMMUNITY HOSPITAL THROUGH THE USE OF A POLYMERASE CHAIN REACTION (PCR) SYSTEM

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Purpose: Ephraim McDowell Regional Medical Center (EMRMC) invested in the BioFire FilmArray technology, which allows for fast

pathogen identification of blood cultures through the use of polymerase chain reaction (PCR) testing, to help improve antimicrobial

stewardship. In theory, more rapid identification of the organism should allow for less empiric treatment days and a faster time to treat with an appropriate targeted antimicrobial regimen. Adult patients at EMRMC with positive blood cultures prior and post implementation of the BioFire FilmArray will be evaluated. The purpose of this study is to evaluate the impact of BioFire FilmArray technology on antimicrobial stewardship at EMRMC. **Methods:** This study is a retrospective medical chart review of adult patients (age ≥ 18) who had positive blood cultures that were tested using the BioFire FilmArray technology at EMRMC in Danville, Kentucky. A report from Meditech will be generated for all adult patients who had positive blood cultures between March 1st, 2015 and September 30th, 2015. This report includes those patients prior to the implementation of the BioFire FilmArray technology. A second report will be generated for all adult patients who had positive blood cultures between March 1st, 2016 and September 30th, 2016. This report includes those patients post implementation of the BioFire

FilmArray technology. Data collected will include patient age, blood culture results, number of days of empiric antibiotic therapy, number of days of targeted antibiotic therapy, total number of days of antibiotic therapy, accuracy of BioFire FilmArray results, and length of stay. All the data collected for this study will be removed of any subject identifiers and will be maintained confidentially. This study design has been approved by the Ephraim McDowell Regional Medical Center Institutional Review Board. **Results:** Data collection and analysis is currently underway and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize how pathogens are identified in blood cultures more quickly through PCR testing.

Identify how the use of technology using rapid diagnostic testing can be employed to improve antimicrobial stewardship.

Self Assessment Questions:

Which of the following nucleic acid amplification methods is incorporated into the BioFire FilmArray technology?

- A Ligase chain reaction (LCR)
- B Multiplex polymerase chain reaction (PCR)
- C Strand displacement amplification (SDA)
- D emrmc.com\cegoodman@emrmc.com Loop mediated isothermal

When using BioFire FilmArray, what is the anticipated total time to organism identification?

- A < 24 hours
- B 48 hours
- C 72 hours
- D 96 hours

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-512L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

SAFETY OF SOTALOL INITIATION IN PATIENTS WITH A PROLONGED CORRECTED QT INTERVAL: EXPERIENCES FROM AN ACADEMIC MEDICAL CENTER

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Purpose: Sotalol, a Class III antiarrhythmic medication, has approved dosing recommendations for initiation based on the QT interval, but no recommendations regarding acceptable baseline corrected QT (QTc) intervals or maximum permissible change in QTc. The purpose of this single center, retrospective, cohort study is to describe the safety of initiating sotalol in patients with an acceptable baseline QT interval less than or equal to 450 milliseconds (msec) and a prolonged QTc interval greater than 450 msec. **Methods:** Patients age 18 years or older initiated on sotalol for the indication of atrial fibrillation or atrial flutter during admission beginning on July 1, 2012 through December 31, 2014 were included as long as their baseline QT interval was less than or equal to 450 msec, QTc interval was greater than 450 msec, and electrocardiogram (ECG) was in sinus rhythm. Those with paced rhythms and bundle branch blocks resulting in excessive QRS prolongation greater than 120 msec were excluded. The primary outcome was the proportion of patients discharged on sotalol. Secondary outcomes included the number of patients that required sotalol dose reduction due to QT or QTc prolongation prior to discharge as well as the incidence of atrial or ventricular arrhythmias after drug initiation. Descriptive statistics with measures of central tendency were used to evaluate baseline demographics and endpoints. **Results:** During the study timeframe, 81 of the 1,200 patients screened for enrollment were included. Primary reasons for exclusion were baseline ECG not in sinus rhythm (26.6%), QTc less than or equal to 450 msec (23.6%), and sotalol continuation from home (18.7%), among others. Further results are in progress. **Conclusions:** Results are expected to provide insight into an area of clinical practice that has yet to be studied and establish the safety of initiating sotalol in patients with a prolonged QTc interval at baseline.

Learning Objectives:

Describe concerns associated with sotalol use in patients with a prolonged baseline QTc interval

Identify risk factors for QT/QTc prolongation

Self Assessment Questions:

What is a concern associated with sotalol use in patients with a prolonged baseline QTc interval?

- A: Reduction in renal clearance
- B: Increased risk of Torsades de Pointes
- C: Increase in patient reported symptoms
- D: Reduction in effective ventricular refractory period

Which of the following is a risk factor for QTc prolongation?

- A: Male sex
- B: Tachycardia
- C: Hyperkalemia
- D: Concomitant antiarrhythmic

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-933L05-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF SULFAMETHOXAZOLE/TRIMETHOPRIM DOSING FOR THE TREATMENT OF METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS SKIN AND SOFT TISSUE INFECTIONS IN THE OBESE POPULATION

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Purpose: Pharmacokinetics and pharmacodynamics are primary predictors of antibiotic efficacy and safety. It is documented that variability in these patient-specific factors impact response to antimicrobial therapy. Obese patients have demonstrated alterations in pharmacokinetic parameters due to differences in body composition including adipose tissue, lean muscle, and blood volume. Limited data exist to guide dosing in the obese population. Sulfamethoxazole/trimethoprim (SMX/TMP), an oral antimicrobial used to treat methicillin-resistant *Staphylococcus aureus* (MRSA) skin and soft tissue infections (SSTI), is recommended in doses of 1-2 double-strength (SMX 800 mg/TMP 160 mg) tablets by mouth every 12 hours for this indication. Despite these recommendations, few studies have explored the efficacy of this dosing regimen for the treatment of MRSA SSTI in the obese population. The purpose of this study is to evaluate the efficacy of SMX/TMP dosing regimens for the treatment of SSTI in obese patients (BMI > 30 kg/m²) and to examine if a correlation exists between dose and clinical outcome. The primary outcome is efficacy of dosing regimens denoted by incidence of SSTI reoccurrence at 90 days from initial Emergency Department (ED) visit. Secondary endpoints include presence of abscess, use of incision and drainage, blood cultures with isolated MRSA, treatment duration, and weight-based dose and renal function estimates used to evaluate relationship between standard/weight-based dosing on clinical efficacy. **Methods:** A retrospective chart review analyzed obese patients 18 years of age or older prescribed SMX/TMP for confirmed or suspected MRSA SSTI from the Eskenazi Health ED between August 1, 2015 and August 31, 2016. Patients were identified utilizing ICD9/ICD10 billing codes for SSTI and were required to have filled a SMX/TMP prescription at an Eskenazi Health outpatient pharmacy. Weight-based dosing and renal function were calculated using multiple methods. **Results/Conclusion:** Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify appropriate treatment regimens for the outpatient management of methicillin-resistant *Staphylococcus aureus* skin and soft tissue infection.

Describe important pharmacokinetic differences between non-obese and obese patients and their impact on drug dosing.

Self Assessment Questions:

Which of the following correctly identifies a physiologic difference observed in the obese patient population and its corresponding effect on pharmacokinetics?

- A: Smaller blood volume: smaller volume of distribution
- B: Decreased glomerular filtration rate: shorter half life
- C: More rapid drug metabolism: longer half life
- D: Increased glomerular filtration rate: shorter half life

Which of the following strategies would be appropriate treatment for a MRSA skin and soft tissue infection?

- A: Incision and drainage, SMX/TMP 800/160 mg 1-2 DS tablets by mouth
- B: Incision and drainage, amoxicillin 875 mg every 12 hours
- C: Incision and drainage, SMX/TMP 800 mg/160 mg 1-2 DS tablets by mouth
- D: Incision and drainage, levofloxacin 750 mg by mouth daily

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-478L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF PHARMACIST INTERVENTION ON BLOOD GLUCOSE CONTROL FOR INPATIENTS ON A ROUTINE MEDICAL FLOOR

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PURPOSE: The current standard of care set forth by the American Diabetes Association provides a blood glucose goal of less than 180 mg/dL for patients in a hospital setting. Although this goal has proven to be the ideal target for hospitalized patients, it has not consistently been the standard of care for diabetic patients on routine medical floors. The primary objective of this study is to determine the impact of pharmacist led blood glucose monitoring and subsequent clinical interventions for inpatients on general medical floors. The aim is to develop a process that can be carried on by pharmacists to improve blood glucose control for inpatients at Southwest General. **METHODS:** Daily blood glucose reports are generated in the laboratory department for inpatients on general medical floors identifying patients with at least two blood glucose readings at or above 250 mg/dL from the previous day. Once these patients are identified, exclusion criteria is applied to isolate the patients that will be included in the study. Data is then collected on these patients and a thorough assessment of their blood glucose control is completed. An algorithm is used to guide recommendations on insulin titration and appropriateness of oral antidiabetic agents. These recommendations are communicated to the attending physician and documented in the electronic medical record. The primary outcome will assess the percentage of blood glucose readings at the goal of less than 180 mg/dL with pharmacist intervention compared to the percentage of blood glucose readings at goal in patients before implementation of this project. As a safety endpoint, the amount of blood glucose readings below 70 mg/dL will be monitored. **RESULTS/CONCLUSION:** Results and conclusion will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Define blood glucose goals for inpatients on routine medical floors.
Recognize appropriate insulin titration methods to optimize blood glucose control for inpatients.

Self Assessment Questions:

What is the correct blood glucose goal for inpatients on a routine medical floor?

- A: <120 mg/dL
- B: <140 mg/dL
- C: <180 mg/dL
- D: <220 mg/dL

Which insulin regimen is not appropriate for blood glucose management in a hospitalized patient?

- A: Moderate insulin lispro correction scale
- B: Insulin glargine 40 units at bedtime
- C: Insulin glargine 30 units at bedtime with mild insulin lispro correction
- D: Insulin NPH/Regular 70/30 20 units twice daily with meals

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-463L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DEVELOPMENT AND IMPLEMENTATION OF A MEDICATION THERAPY MANAGEMENT (MTM) AND MEDICATION SYNCHRONIZATION PROGRAM FOR OUTPATIENT PHARMACY PATIENTS AT AN ACADEMIC MEDICAL CENTER

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Purpose: Medication-related problems and non-adherence are significant healthcare issues. In order to minimize these issues, a multifaceted approach needs to be taken. The purpose of this study is to implement workflows for the provision of medication therapy management (MTM) and medication synchronization services and to evaluate their execution. **Methods:** This is a prospective, observational, quality improvement project evaluating MTM and medication synchronization services for Froedtert Health self-insured patients at an academic medical centers outpatient pharmacies. Additionally, for level II MTM and medication synchronization interventions, patients were required to meet one of the following criteria: receive four or more chronic medications for any of eight pre-specified disease states, be discharged from the hospital within the past fourteen days, be referred by the prescriber, require coordination of care due to multiple prescribers, or have health literacy issues as determined by a pharmacist. Study data will be collected November 2016 through April 2017. The primary endpoint is to evaluate execution of the MTM and medication synchronization services. This will be measured by the percentage growth in the number of level I MTM, level II MTM, and medication synchronization interventions. Secondary endpoints will include level I MTM interventions identified vs completed, level II MTM interventions identified vs scheduled vs completed, average number of level I MTM interventions made during level II MTM visits, average intervention completion time, setting of each intervention, comparative return on investment for the health system, number of medication synchronizations performed vs remaining synchronized through the end of the study period, and reason for loss of medication synchronization. Data analysis will be completed utilizing descriptive statistics and percentage growth from baseline. **Results & Conclusion:** Data collection and evaluation is currently being conducted. Results and conclusion will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Define medication therapy management and medication synchronization and discuss what types of interventions were performed in this study under these umbrella terms.
Describe the impact that pharmacists can have on both patient care and the healthcare system through the provision of MTM and medication synchronization services.

Self Assessment Questions:

According to a study by Holdford and Inocencio, patients who did what were 4.3-6.1 times more likely to be adherent to their medication therapy?

- A: Participated in MTM interventions, including a cost effectiveness intervention
- B: Participated in an interactive medication therapy management application
- C: Participated in an appointment-based medication synchronization
- D: Enrolled in an automated refill ready reminder or mail order pharmacy

Potential pharmacist MTM interventions could include all of the following, except?

- A: Conversion to a 90 day medication supply
- B: Ordering of labwork to assess for medication need
- C: Recommending that the provider prescribe a therapeutic alternative
- D: Educating the patient on how to properly use a spacer

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-764L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

OUTCOMES OF AN INPATIENT PROTON PUMP INHIBITOR STEWARDSHIP PROGRAM POST HOSPITAL DISCHARGE

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Purpose: Proton pump inhibitors (PPIs) are widely used in the treatment of acid-related disorders, however, studies suggest that up to 80% of PPIs are prescribed without an evidence-based indication. PPIs have been associated with adverse events, including pneumonia, fractures, and Clostridium difficile infection. Based on this information, a PPI stewardship program was created to evaluate for appropriateness of PPI continuation and to subsequently discontinue inappropriate PPI therapy. The purpose of this study is to evaluate the success of a PPI stewardship program in discontinuing PPIs without proper indications upon hospital discharge. **Methods:** All patients admitted to an internal medicine service from 3/14/16 to 8/14/16 on a home PPI were evaluated by the PPI stewardship team for appropriate indications to continue therapy. The primary objective of this study is to determine the percentage of patients who successfully discontinue or de-escalate their PPI upon hospital discharge as a result of the PPI stewardship program. The secondary objective of this study is to evaluate risk factors that may contribute to patients' failure to successfully discontinue or de-escalate PPI therapy. **Results:** Of the 64 patients who underwent intervention, 42 were counseled to discontinue PPI therapy upon hospital discharge, with a success rate of 57.1%, and 22 patients were counseled to decrease their PPI from twice daily dosing to once daily dosing with a success rate of 81.8%. The only identifiable risk factor for unsuccessful outpatient PPI discontinuation was increased duration of therapy. No risk factors were identified for unsuccessful outpatient de-escalation of therapy. Of the patients who underwent outpatient PPI intervention, only one complication was reported. **Conclusion:** A PPI stewardship program resulted in successful reduction of inappropriate PPI use, substantiating reports of PPI overprescribing. In addition to the successful interventions of the PPI stewardship team, complications from the program appear minimal.

Learning Objectives:

Identify appropriate candidates for therapy with proton pump inhibitors, as well as potential victims of overprescribing.

Identify the potential risks associated with the use of proton pump inhibitors.

Self Assessment Questions:

Which of the following is an appropriate indication for use of a proton pump inhibitor?

- A Use in conjunction with ranitidine and antibiotics in the treatment of GERD
- B Use for 4-8 weeks in the treatment of a duodenal ulcer.
- C Use for a minimum of 12 weeks in the treatment of gastroesophagitis
- D Use for relief of chest pain in a patient with unknown medical history

Which of the following statements is correct?

- A Proton pump inhibitors are recommended as first line therapy in the treatment of GERD
- B Proton pump inhibitors have been associated with adverse events
- C Proton pump inhibitors are equipotent and dose adjustments are not necessary
- D Proton pump inhibitors have a rapid onset of action, making them ideal for the treatment of GERD

Q1 Answer: B Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-699L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PHENOBARBITAL FRONT LOADING DOSE COMPARED WITH LOW INTERMITTENT DOSES FOR BENZODIAZEPINE REFRACTORY SEVERE ALCOHOL WITHDRAWAL: A RETROSPECTIVE COMPARISON

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Purpose: High variability exists in benzodiazepine refractory alcohol withdrawal syndrome (AWS) management. Phenobarbital (PB) has been used adjunctively in severe AWS when benzodiazepines alone have been ineffective. Specifically, adjunct phenobarbital (PB) dose escalation strategies in ICU patients have shown significant reductions in mechanical ventilation days. The purpose of this study is to retrospectively analyze two different phenobarbital dosing strategies and evaluate differences in Medical Intensive Care Unit (MICU) length of stay, mechanical ventilation duration, and safety. **Methods:** The following study is a single-center study conducted in patients 18 years and older admitted to the MICU of a large community teaching medical center requiring treatment for severe AWS. The study will include a retrospective efficacy and safety comparative analysis of two separate severe AWS PB dosing strategies, requiring a Clinical Institute Withdrawal Assessment for Alcohol Scale (CIWA-Ar) greater than or equal to 20. The low-intermittent PB dosing strategy includes a one-time bolus of 260mg IVP followed by PB 130 mg IVP every 15 minutes for 8 doses, maximum 1,300 mg of PB collected from January 2013 to July 2015. The loading PB dosing strategy includes a one-time 10 mg/kg PB loading dose IVP over 30 minutes, collected from July 2015 to December 2016. The primary outcomes are the time from phenobarbital administration to CIWA-Ar score less than 20 and MICU length of stay. Secondary outcomes include complications of alcohol withdrawal, mechanical ventilation days, phenobarbital adverse effects, and readmission to ICU. The following data points will also be collected: concomitant amounts of sedative medications, serum PB levels, intubation rates, prior alcohol use, alcohol serum levels if available, and various laboratory data. Results to be presented at Great Lakes Pharmacy Residency Conference 2017.

Learning Objectives:

Identify patients with severe alcohol withdrawal syndrome, eligible for treatment with phenobarbital.

Explain the treatment options available for the treatment of severe alcohol withdrawal syndrome.

Self Assessment Questions:

What is the mechanism of phenobarbitals synergism with benzodiazepines which has resulted in significant reductions in benzodiazepine utilization, ICU admissions, and intubation rates?

- A Phenobarbital prolongs the duration GABA-A chloride channels remain open
- B Phenobarbital increases the frequency of GABA-A chloride channel opening
- C Phenobarbital is a potent α -2 agonist that decreases sympathetic outflow
- D Phenobarbital is a NMDA receptor antagonist

Which of the following is an adverse effect of Phenobarbital?

- A Anion Gap Metabolic Acidosis
- B Emergence Reactions
- C Hyperlipidemia
- D Respiratory Depression

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-615L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

COST EFFECTIVENESS ANALYSIS OF NEW LIPID GUIDELINES IN VETERAN PATIENTS

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Purpose: A variety of analyses have been conducted on the cost effectiveness of statin therapy. Studies have also evaluated the optimal

atherosclerotic cardiovascular disease risk (ASCVD) value, strategies for monitoring lipid levels, and adverse effects. At this time, limited

information is available comparing the cost effectiveness of new treatment recommendations to prior low-density-lipoprotein cholesterol (LDL-C) target focused therapy. A study of this nature provides valuable information on the overall outcomes of newer recommendations and the financial benefit to health care systems. Methods: A cost effectiveness analysis is being conducted via a retrospective chart review on Battle Creek Veterans Affairs Medical Center patients with a diagnosis of dyslipidemia. Patients with a dyslipidemia diagnosis in July 2009 and July 2014 have been identified from the Veterans Affairs corporate data warehouse and evaluated for eligibility criteria by the investigators. Those meeting criteria are being reviewed for one year after the identifying primary care visit. A total of 250 patients from each time frame are being examined. Data collected includes number of dyslipidemia related visits, laboratory tests conducted, medication received, changes to dyslipidemia regimen, adherence to regimen and occurrence of a negative cardiovascular event (e.g. myocardial infarction, ischemic stroke, revascularization, or cardiac related death). All data are de-identified and personal protected health information access is restricted to the investigators. Upon completion of data collection, a decision tree analysis will be created to compare the cost effectiveness of each time frame. Direct cost information has been obtained from sources within the VA healthcare system. Acute event cost values have been obtained from primary literature searches. Descriptive statistics and a chi-squared test will be utilized to evaluate differences between patient baseline demographics. Significance will be accepted at $p < 0.05$. Institutional Review Board approval has been received for the study.

Learning Objectives:

Identify differences in treatment recommendations between previous dyslipidemia guidelines and current standards of practice.

Recognize significant costs to the healthcare system associated with lipid management and cardiovascular outcomes.

Self Assessment Questions:

1. Which of the following statement(s) is no longer a recommendation(s) for the treatment and monitoring of dyslipidemia?

- A Target a total cholesterol level less than 200mg/dL
- B: Recommend moderate-intensity state therapy for patient greater than 40 years of age
- C: Use ASCVD risk score to guide treatment recommendations
- D: Focus on percentage of LDL reduced opposed to a targeted number

2. Significant costs to the healthcare systems associated with lipid management and cardiovascular outcomes does NOT include which of the following?

- A Myocardial Infarction
- B Cardiac related death
- C Hemorrhagic stroke
- D Revascularization

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-316L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATING THE IMPACT OF ALVIMOPAN IN RADICAL CYSTECTOMY CARE PATH OUTCOMES

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Purpose: Radical cystectomy (RC) is among the most complex urological surgeries and is predominately used to treat muscle invasive

bladder cancer. This procedure is associated with considerable complications including post-operative ileus (POI) which res

Learning Objectives:

Identify appropriate methods to prevent complications after a radical cystectomy.

Discuss the dosing and pharmacologic profile of alvimopan within an enhanced recovery after surgery (ERAS) protocol.

Self Assessment Questions:

Which of the following methods are used to prevent post-operative ileus and other complications after a radical cystectomy?

- A ERAS protocols
- B: Chewing gum
- C: Multi-modal analgesia
- D: All of the above

What is the typical alvimopan dosing for a radical cystectomy patient?

- A 12 mg pre-operative and 12mg twice daily for maximum of 15 days
- B 12 mg pre-operative and 12mg twice daily for maximum of 7 days
- C 12 mg twice daily post-operatively for maximum of 7 days
- D 12 mg pre-operatively with no post-operative doses

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-975L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ABNORMAL EFFECTS OF NORMAL SALINE: EXAMINING THE ASSOCIATION BETWEEN HYPERCHLOREMIA AND ORGAN DYSFUNCTION IN PEDIATRIC SEPSIS

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Statement of Purpose: Since the publication of sepsis guidelines, much research has focused on the importance of adequate fluid resuscitation with isotonic crystalloid fluids as first line therapy. Guidelines have historically recommended 0.9% sodium chloride as a first line resuscitation fluid for its isotonic properties and favorable cost profile in both adult and pediatric patients. Though 0.9% sodium chloride is often called "normal saline" it contains much higher levels of electrolytes than what is naturally found in serum. Supraphysiologic chloride load has been the subject of research in adults, and although there is no definite consensus, hyperchloremia has been associated with increased mortality in septic patients. To our knowledge there are no published studies evaluating whether septic pediatric patients are at higher risk of a poor outcome such as multiple organ dysfunction due to hyperchloremic metabolic acidosis caused by resuscitation with 0.9% sodium chloride. The purpose of this study shall be to compare the incidence of organ dysfunction between hyperchloremic and non hyperchloremic septic pediatric patients who were bolused with 0.9% sodium chloride. **Statement of Methods:** This is a retrospective, single center observational cohort study of septic pediatric patients presenting from January 1, 2012 through January 15, 2017. Patients who developed hyperchloremia were compared to patients who did not. Patients were determined to be septic if they met systemic inflammatory response syndrome criteria and there was suspicion for or documented infection. Hyperchloremia was defined as serum chloride greater than 110 meq per liter. The primary endpoint is incidence of organ dysfunction between groups as measured by Goldstein diagnostic criteria. Secondary endpoints include in hospital mortality, hospital length of stay, incidence of sustained hyperchloremia, incidence of severe hyperchloremia, peak chloride level and incidence of vasopressor use. **Summary of results to support conclusions:** pending **Conclusions:** pending

Learning Objectives:

Discuss literature supporting the potentially negative effects of hyperchloremia in septic adult and pediatric patients
Review the relationship between organ dysfunction measured by Goldstein diagnostic criteria and hyperchloremia as determined by the present study

Self Assessment Questions:

Which of the following is incorrect regarding the effects of acidosis at the cellular level?

- A: acidosis impairs leukocyte chemotaxis
- B: acidosis exacerbates vasodilation
- C: acidosis leads to oxidative stress
- D: acidosis decreases production of reactive oxygen species

Which organ system is not evaluated by Goldstein diagnostic criteria?

- A: cardiac function
- B: pulmonary function
- C: endocrine function
- D: neurological function

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-626L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF A PHARMACIST ROLE DURING TRANSITIONS OF CARE AND IMPACT ON MEDICATION RECONCILIATION DISCREPANCIES AND PATIENT SATISFACTION SCORES

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Purpose: The importance of medication reconciliation as a method for preventing medication errors and adverse events has greatly lagged behind the inception of medication reconciliation in 2005. With the development of the Affordable Care Act in 2010, even more emphasis has been placed on effective medication reconciliation. Quality of patient care is becoming one of the largest determinants of hospital reimbursement. As such, Saint Joseph Mercy Oakland is focusing on improving processes related to transitions of care. The lack of acceptable practices during transitions of care is a serious problem for patient safety and satisfaction, but also for acceptable hospital reimbursement. The pharmacy team intends to positively impact patient care by reducing the number of medication discrepancies and errors during transitions of care. **Methods:** This is a prospective, single center study of patients presenting to Saint Joseph Mercy Oakland during a three-month time period. Patients selected for study inclusion must meet criteria for high 30-day mortality risk on admission, receive treatment on a designated general medical floor for greater than 24 hours, and subsequently discharged from this floor. Exclusion criteria include patients: less than 18 years of age on date of enrollment, from a correctional facility, pregnant or breastfeeding, receiving palliative care or elective hospice, or left the hospital against medical advice. The pharmacist's role is to review all medication profiles and confirm all medications are documented correctly in the patient's medical record. The pharmacist would communicate all medication discrepancies with the patient's prescriber and strive to ensure all medications were corrected on admission to optimize care. Additionally, the pharmacist will attempt to perform education to all patients who will be discharged with a new medication, prior to discharge. Historical data will serve as the comparator to assess the pharmacists' impact on patient satisfaction scores, a secondary outcome. **Results:** To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize the importance of high-quality medication reconciliations at all transitions of care.
Identify health care practitioners who have a role in medication reconciliations.

Self Assessment Questions:

For all accredited healthcare institutions, the Joint Commission assesses the hospitals' compliance with various National Patient Safety Goals. One of those Patient Safety Goals is to:

- A: Improve patient satisfaction scores
- B: Deliver important information to the right practitioner
- C: Record and pass along correct information about a patient's medications
- D: Perform medication reconciliation on every patient, at each transition

What health-care provider does not have a role in medication reconciliation?

- A: Physical Therapist
- B: Pharmacist
- C: Nurse
- D: Physician

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-374L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

COMMUNITY PHARMACIST INITIATED FALLS RISK ASSESSMENT AND MITIGATION

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Falls and fractures are a major contributor to national healthcare spending. Experiencing a fall is the most common reason for emergency department visits by patients older than 65 years old. Falls can be directly linked to fatal events. In 2012, falls accounted for 24,170 fatalities in the United States. Non-fatal falls were associated with \$31.3 billion in direct costs in 2015. This accounting does not include the increased healthcare costs due to accelerated needs for nursing home care. Medications are a modifiable risk factor that can be adjusted to mitigate the risk of falls and fractures. The primary objective of this study is to determine physician acceptance rates of pharmacist recommendations for patients with a high risk for future falls. Patient and recommendation characteristics associated with provider acceptance will be included as a subset analysis. Methods: In this quality improvement project, patients enrolled in Medicine Shoppes bubble-packaging compliance program will receive a prospective medication regimen assessment. The medication assessment will be focused on medications with overlapping side effects that contribute to risk of falls. The risk of future falls will be assessed in two domains: cumulative anticholinergic burden and number of CNS active medications. Anticholinergic burden will be determined using the Anticholinergic Risk Scale (ARS). In accordance with the 2015 Beers Criteria Update, ≥3 CNS medications will qualify a patient as high risk for a medication-associated fall. Study participants that meet criteria for high risk of future falls in either domain will receive a medication review. Recommendation acceptance is the primary endpoint of the study. A secondary analysis of recommendation acceptance factors will be evaluated using Chi-squared statistical analysis. Recommendations will be characterized as dose reductions, discontinuations, or substitutions. Patient demographics selected for assessment include: age, gender, and community versus assisted living facility residence. Results: To be presented at Great Lakes.

Learning Objectives:

Recognize medications that contribute to anticholinergic side effect burden.

Identify medication classes that contribute to CNS burden as defined by 2015 Beer's Criteria Update

Self Assessment Questions:

Which of the following medication classes contribute to CNS burden (as defined by the 2015 Beer's Criteria Update)?

- A Any medication known to cross the blood-brain-barrier
- B Selective-norepinephrine serotonin reuptake inhibitors used for ne
- C Opioid narcotics used for chronic back pain
- D Anticonvulsants used for seizure prophylaxis

Which of the following correctly ranks four medications from most anticholinergic to least anticholinergic?

- A Oxybutinin > Ciprofloxacin > Loratadine > Paroxetine
- B Oxybutinin > Loratadine > Paroxetine > Ciprofloxacin
- C Paroxetine > Oxybutinin > Loratadine > Ciprofloxacin
- D Loratadine > Paroxetine > Oxybutinin > Ciprofloxacin

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-920L05-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

COLLABORATION BETWEEN COMMUNITY HOSPITAL AND EXTENDED CARE FACILITY UTILIZING A TRANSITIONS OF CARE PHARMACIST

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Purpose: Patients transferred from hospitals to extended care facilities (ECF) are at risk for errors in transitions of care (TOC) due to lack of communication and subsequent medication discrepancies. Specific patient populations identified at Southwest General with errors in TOC are those transferred for antibiotic treatment and those with congestive heart failure (CHF). The most common discrepancies for patients on antibiotics are missing stop dates and lack of appropriate antimicrobial monitoring. Patients on antibiotics also experience delays in continuation of therapy at the ECF and are not assessed for de-escalation or transition to oral therapy. Patients with CHF are not receiving proper monitoring of weights, appropriate diet restrictions, patient education, or appropriate medications within the ECF. The purpose of this collaboration between a community hospital, TOC pharmacist, and ECF is to improve the transition of patients on antibiotics and patients with CHF by addressing medication discrepancies and empowering patients and caregivers. Methods: As part of the collaboration between institutions, the TOC pharmacist was granted access to the EMR at the ECF to improve the translation of health information between facilities. In coordination with the inpatient antimicrobial stewardship pharmacist, the TOC pharmacist identifies patients on antibiotic therapy and communicates pertinent information to the ECF staff. Data collection for this patient population focuses on improving the transfer of orders, preventing delays in therapy, ensuring appropriate antimicrobial dosing and monitoring, and obtaining total duration of therapy. The TOC pharmacist also provides medication and lifestyle education to CHF patients before transfer to the ECF. Data collection for CHF patients is focused on ensuring appropriate transcription of medications, adherence to diet restrictions and daily weights, and providing discharge care conferences in the ECF. The data collected will be analyzed with descriptive statistics. Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recall the prevalence of medication discrepancies during transition from hospitals to skilled nursing facilities

Discuss the successful tools and processes utilized to identify and prevent errors in TOC for patients at Southwest General

Self Assessment Questions:

One study determined that at least one medication discrepancy occurs on what percentage of skilled nursing facility admissions?

- A 46.7%
- B 20.2%
- C 71.4%
- D 32.3%

What tools and/or processes have demonstrated positive outcomes during transitions of care from hospital to ECF for patients with heart failure?

- A Providing medication and disease state education from a pharmacist
- B Pharmacist performing medication reconciliation at the point of transfer
- C Pharmacist performing medication reconciliation at the point of transfer
- D A and C

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-779L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EFFECT OF LIPOGLYCOPEPTIDES ON IN VITRO SUSCEPTIBILITIES OF METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS (MRSA)

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Purpose: Methicillin-resistant *Staphylococcus aureus* (MRSA) is a major cause of nosocomial and community-associated infections. Recent, alarming emergence of vancomycin-intermediate and -resistant MRSA strains highlighted the need for new anti-MRSA antibiotics. In 2014, two lipoglycopeptides, oritavancin and dalbavancin were approved for the treatment of acute bacterial skin and skin structure infections. Long half-life of 8-10 days for oritavancin, and 204 hours for dalbavancin make them therapeutically appealing. Long half-life may contribute to prolonged exposure of sub-therapeutic concentrations and subsequent potential increase in minimum inhibitory concentration (MIC). To-date, MRSA resistance to lipoglycopeptides has not been reported, neither is their effect on other antibiotics susceptibilities. This study was conducted to examine the capability of lipoglycopeptides to increase MIC of commonly prescribed anti-MRSA antibiotics. Methods: Two MRSA strains were serially exposed to dalbavancin and oritavancin by employing serial passages method. Sensititre Gram Positive Plate was used to determine MICs for initial and subsequent strains. After Sensititre plate incubation, bacterial growth 1 dilution below the MIC was collected. This inoculum was used to determine the next MIC by incubating on a Blood Agar, then reinoculating onto Sensititre Plate to determine the next MIC. This serial passages method was repeated 16 times. Preliminary Results: After 16 serial passages, the MICs of dalbavancin induced strains increased 2 to 4-fold for vancomycin, ceftaroline, linezolid, telavancin and dalbavancin. Oritavancin induced strains increased linezolid and dalbavancin's MIC by 2 folds. Oritavancin's MICs varied by 2 to 6-fold for each subsequent serial passage. Conclusion: Lipoglycopeptides use poses a risk for increase in MRSA MICs to not only lipoglycopeptides but also to commonly prescribed anti-MRSA antibiotics including vancomycin, ceftaroline, linezolid, and telavancin. Sensititre Gram Positive Plate is not a reliable susceptibility testing method of Methicillin-resistant *Staphylococcus aureus* (MRSA) to oritavancin.

Learning Objectives:

Discuss pharmacokinetics and pharmacodynamics properties of lipoglycopeptides and their potential contribution to resistance development

Outline the outcomes of prolonged exposure to lipoglycopeptides

Self Assessment Questions:

Which of the following properties place lipoglycopeptides at risk for development of resistance?

- A: Long half-life of > 8 days
- B: Prolonged exposure of organism to sub-inhibitory concentrations
- C: Enterohepatic circulation
- D: A and B

Based on the presented study, Sensititre Gram Positive Plate is not a reliable susceptibility testing method of Methicillin-resistant *Staphylococcus aureus* (MRSA) to which of the following antibiotics

- A: Oritavancin
- B: Dalbavancin
- C: Linezolid
- D: Vancomycin

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-503L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION OF AN ASPIRIN DESENSITIZATION PROTOCOL FOR PATIENTS REQUIRING DUAL ANTIPLATELET THERAPY

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Purpose: Dual antiplatelet therapy (DAPT) with aspirin and a P2Y12 inhibitor is recommended for at least 12 months following a percutaneous coronary intervention (PCI) to reduce the risk of stent thrombosis. Although aspirin is an ACCF/AHA Class I, Level of Evidence A recommendation for daily use after PCI, 7 patients at Aurora St. Luke's Medical Center (ASLMC) did not receive aspirin in 2015 after stent placement due to an aspirin allergy. Desensitization involves the administration of increasing aspirin doses to reduce the potential for a hypersensitivity reaction. There currently are no guidelines to direct desensitization in the inpatient setting and Aurora Health Care does not have a standardized method for desensitization. The purpose of this project is to create and implement an aspirin desensitization protocol for PCI patients who require DAPT. Methods: A literature review was completed to evaluate published aspirin desensitization protocols. The optimal aspirin starting dose, intervals, cumulative dose, inclusion/exclusion criteria, premedications, and emergency medications were determined based on the literature review. An aspirin desensitization protocol was created and was approved by an allergist, intensivist, and cardiologist. Education documents were created for pharmacists, nurses, and physicians. The protocol was implemented as a pilot with paper orders at ASLMC. An order set and panel are being added to the electronic health record (EHR). System wide approval and education will be completed prior to the availability of the electronic orders. A medication use evaluation will be completed to assess the safety and efficacy of the protocol for patients from December 23, 2016 through April 1, 2017. Aspirin prescribing trends will also be compared before and after protocol implementation. Results and conclusions: Results and conclusions from the protocol implementation will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the purpose of an aspirin desensitization protocol for Aurora Health Care hospitals with a catheterization lab.

Describe potential barriers to the creation and implementation of an aspirin desensitization protocol at a large health care system.

Self Assessment Questions:

Which of the following are benefits of an aspirin desensitization protocol

- A: Ensures that all patients who undergo PCI with stenting will receive aspirin
- B: Allows aspirin allergic PCI patients to safely be discharged without aspirin
- C: Optimizes guideline recommended antiplatelet therapy for aspirin
- D: Allows for individualization of the aspirin desensitization process for each patient

Which of the following is a potential barrier to the implementation of an aspirin desensitization protocol at a large health care system?

- A: Physician approval
- B: Lack of evidence to support the use of aspirin after PCI
- C: Addition of an order set in the EHR
- D: A and C

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-387L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION OF PHARMACIST-DRIVEN BETA-LACTAM ALLERGY VERIFICATION

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Purpose : One focus of antimicrobial stewardship is limiting prolonged exposure to unnecessary broad-spectrum antibiotics as a result of patient-reported allergies. The Centers for Disease Control and Prevention (CDC) reports among patients that self-report allergies, only 10-15% have a true allergy which is confirmed by a positive skin test. This suggests that reactions are often mild or should be considered not true allergies. Although the cross reactivity evidence between penicillins, cephalosporins, and carbapenems is low, many clinicians avoid the use of all beta-lactams when a penicillin allergy is reported. Due to patient self-reported allergies and a lack of restriction policy, aztreonam use at the study institution is higher than the national average. The primary objective of this study is to determine if pharmacist-driven verification and intervention of beta-lactam allergy reactions decreases the inappropriate use of aztreonam. **Methods :** Retrospective data from July 2016 through August 2016 was collected for all inpatient aztreonam orders at the study institution. Retrospective data was also collected from November 2016 through January 2017 post-implementation of pharmacist-driven interventions. Data collected includes patients drug allergies and reactions, antimicrobial indication, culture results, and appropriateness of aztreonam use. Data will be used to determine if pharmacy intervention helps decrease the use of aztreonam. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify appropriateness of utilizing other beta-lactams with a reported beta-lactam allergy

Discuss the impact pharmacists have on antimicrobial stewardship with the implementation of beta-lactam allergy verification

Self Assessment Questions:

Patient AB is admitted to the hospital with signs and symptoms of community acquired pneumonia. Her allergy history shows that she experienced a mild rash with amoxicillin. Which of the following state

- A All beta-lactams should be avoided in this patient due to her allergy
- B: Aztreonam plus azithromycin should be used
- C: Patient had a mild allergy therefore ceftriaxone and azithromycin
- D: There is a high chance of cross-reactivity between amoxicillin and

How can pharmacists help with antimicrobial stewardship?

- A Verify patients allergies for appropriate antibiotic use
- B Make interventions on streamlining antibiotics when appropriate
- C Recommend appropriate alternatives for patients with beta-lactam
- D All of the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-897L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

COMPARISON OF BURST VERSUS TAPER STEROID DOSING IN COPD EXACERBATIONS

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For chronic obstructive pulmonary disease (COPD) exacerbations, the Global Initiative for Chronic Obstructive Lung Disease guidelines recommend treatment with 5 days of systemic corticosteroids (SCS). The goal of this study is to assess impact of SCS prescribing patterns on 30 day readmission. A retrospective, observational chart review was performed at Community Health Network. Adult patients eligible for inclusion were admitted with a primary diagnosis of acute exacerbation of COPD and discharged on a SCS between December 1, 2015 and March 31, 2016. Patients are categorized based on SCS prescribing. Burst therapy was defined as not more than one decrease in steroid dose throughout admission and discharge prescription. Taper therapy was defined as dose changes more than once throughout the course of the admission and upon discharge. The primary objective of the study is a comparison of 30-day readmission rates for burst vs taper SCS. Secondary objectives will include evaluation of COPD maintenance medications, total amount of SCS prescribed, and 30-day all-cause mortality. At the time of submission, 200 patients have been evaluated for inclusion in the study: 57 patients with burst dosing, 91 taper dosing, and 52 excluded. Of the 148 patients included, a total of 15 patients have experienced a 30 day readmission: 10 (17.5%) patients in the burst group, and 15 (16.5%) patients in the taper group. Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference

Learning Objectives:

State current recommendations for the treatment of COPD exacerbation

Discuss the differences in 30-day readmission rates between the two different steroid dosing groups.

Self Assessment Questions:

What is the GOLD guideline dosing recommendation for oral steroids in patients with a COPD exacerbation?

- A Prednisone 40 mg daily for 5 days
- B: Prednisone taper for 10 days
- C: Methylprednisolone 4 mg taper dose pack
- D: Prednisone 20 mg daily for 7 days

Which of the following is not used in the definition criteria of a COPD exacerbation?

- A Acute change in day-to-day condition
- B Use of rescue inhaler for exercise
- C Condition leads to change in medications
- D Increased sputum production

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-813L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
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TELEPHONE-BASED PHARMACY NALOXONE EDUCATION CLINIC

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Background:

Drug overdoses were the leading cause of accidental death in the US in 2015. Nearly 40% of overdose fatalities involve prescription opioid medications. Veterans who receive care through the Department of Veterans Affairs (VA) are reported to have almost twice the risk for accidental overdose than the general population.

Purpose:

The Aleda E. Lutz VA Medical Center in Saginaw, Michigan serves veterans throughout Northern Michigan. The purpose of the project is to increase access to opioid overdose education and naloxone distribution (OEND) to patients at risk of an opioid overdose. Due to the rural nature of the patient population there has been a lack of access to in-clinic opioid OEND.

Therefore, a telephone-based opioid overdose education service was developed to meet this need.

Methods:

An OEND consult was developed for healthcare providers to order the educational services for at-risk patients through the computerized patient record system (CPRS). The consult included a list of risk factors for overdose such as: concurrent opioid and benzodiazepine prescription, high dose (50 mg or greater of morphine equivalent daily dosing [MEDD]), use of long-acting opioids, history of previous opioid overdose and/or opioid use disorder diagnosis.

Once the consult is placed, a letter with educational materials is mailed to the patient and followed up with a phone call from a clinical pharmacist or pharmacy resident. During the phone contact, patients are educated on overdose risk factors and proper use of naloxone. Patients are encouraged to share this information with a caregiver. The education is documented in the medical record using a newly developed consult response note.

Results:

Data regarding the number of patients educated and supplied naloxone through the clinic as well as overdose risk factors will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify barriers for at-risk patients to receive opioid overdose education and naloxone distribution (OEND)

Discuss the process for establishing a telephone-based OEND clinic

Self Assessment Questions:

Which of the following is not a risk factor for opioid overdose?

- A Chronic hepatitis or cirrhosis
- B: Younger patient or patient new to opioid pain medication
- C: Greater than or equal to 50 mg morphine equivalents per day
- D: Concurrent benzodiazepine and opioid prescription

Which of the following should be included in patient education regarding naloxone?

- A Intra-nasal naloxone is not as effective as Intra-muscular injection
- B Naloxone should be stored in a refrigerator
- C Caregivers administering naloxone should call 911 immediately
- D Overdoses cannot occur if taking medications directly as prescribe

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EFFICACY AND SAFETY OF A VANCOMYCIN DOSING PROTOCOL DEVELOPED FOR MORBIDLY OBESE PATIENTS

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Purpose: The 2009 consensus review on therapeutic drug monitoring of vancomycin dosing recommends an optional loading dose of 25 to 30 mg/kg, followed by 15 to 20 mg/kg (total body weight) intravenously every 8 to 12 hours for patients with normal renal function. No specific dosing recommendations are provided for morbidly obese patients.

However, these patients exhibit altered pharmacokinetic parameters and based on previous studies may require lower mg/kg doses to achieve target trough concentrations. The University of Chicago Medicine (UCM) vancomycin dosing protocol for morbidly obese patients (BMI ≥ 40 kg/m²) was revised in June of 2015 to recommend a loading dose of 25 to 30 mg/kg (maximum 3000 mg) and a maintenance dose of 12.5 to 15 mg/kg (maximum 2000 mg) IV every 8 to 12 hours. This study aims to determine the efficacy and safety of the current UCM vancomycin dosing protocol in morbidly obese patients versus the pre-protocol revision dosing protocol that was consistent with recommendations in the 2009 consensus review. Methods: This single center, retrospective study has been approved by the Institutional Review Board. Morbidly obese patients of at least 18 years who received IV vancomycin between 6/1/2012-5/31/2013 (pre-protocol revision) and 8/1/2015-7/31/2016 (post-protocol revision) were included. The primary endpoint is proportion of vancomycin courses with initial therapeutic trough concentrations. Secondary endpoints include: proportion of therapeutic courses, time to first therapeutic trough, proportion of sub- and supratherapeutic initial vancomycin trough concentrations, all-cause in-hospital mortality, hospital length of stay, intensive care unit length of stay, frequency of loading doses, initial maintenance dose and incidence of vancomycin-associated nephrotoxicity. Categorical data will be evaluated utilizing the chi-square test and continuous data will be evaluated with either the student t-test or Mann-Whitney U test.

Results/Conclusions: Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify current consensus recommendations for vancomycin dosing

Recognize differences in vancomycin pharmacokinetic parameters in morbidly obese patients when compared to nonmorbidly obese patients

Self Assessment Questions:

Which of the following is consistent with current consensus recommendations for initial dosing of vancomycin in patients with normal renal function?

- A Required 25-30 mg/kg loading dose, followed by 15-20 mg/kg IV every 8-12 hours
- B: Optional 25-30 mg/kg loading dose, followed by 15-20 mg/kg IV every 8-12 hours
- C: Required 25-30 mg/kg loading dose, followed by 15-20 mg/kg IV every 12-24 hours
- D: Optional 25-30 mg/kg loading dose, followed by 15-20 mg/kg IV every 12-24 hours

Which of the following describes pharmacokinetic parameters that may be altered in morbidly obese patients when compared to nonmorbidly obese patients?

- A Increased volume of distribution
- B Increased hepatic metabolism
- C Accelerated renal clearance
- D A and C

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-580L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF DEEP SEDATION IN THE ED UPON TRANSFER TO THE ICU

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Purpose: Over-sedation, along with pain and delirium, is associated with increased morbidity and mortality. In clinical trials, minimal levels of sedation and daily interruptions were associated with better outcomes, including a decreased duration of mechanical ventilation and intensive care unit (ICU) length of stay. However, the early phase of sedation in the ICU within the first 48 hours is not well studied. Furthermore, there are very few trials that address the effect of initial depth of sedation on long-term outcomes. The purpose of this study is to analyze the initial sedation practice at Loyola University Medical Center (LUMC). The primary objective is to assess the impact of deep sedation on duration of mechanical ventilation as measured by ventilator-free days in a 28-day period. **Methods Used:** This is a retrospective, single-centered, chart review of adult patients who were initially intubated and sedated in the emergency department (ED) and transferred to the medical ICU or the surgical/trauma ICU at LUMC between August 2014 and January 2017. The study evaluates the long-term outcomes for patients transferred to the ICUs under deep sedation (RASS -5 to -3) compared to sedation within goal (RASS -2 to 0). Patients were identified using continuous sedation order sets for adults in the ED and ICUs. Secondary objectives include ICU and hospital mortality, ICU and hospital length of stay, percent of time spent within goal RASS, cumulative and maximum doses of sedatives and analgesics, and development of delirium within the first 7 days of hospital stay.

Learning Objectives:

Discuss the impact of deep sedation on clinical outcomes
Identify negative consequences of prolonged mechanical ventilation

Self Assessment Questions:

Lower doses of sedatives with a goal of light sedation (RASS 0 to -2) are associated with:

- A Decreased duration of mechanical ventilation
- B Decreased mortality
- C Decreased ICU length of stay
- D A and C

Prolonged mechanical ventilation is associated with an increased risk for developing which of the following:

- A Delirium
- B Infection
- C Gastrointestinal bleeding
- D All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-667L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

OPTIMIZATION OF P2Y12 RECEPTOR INHIBITOR SELECTION FOR PATIENTS WITH ST ELEVATION MYOCARDIAL INFARCTION (STEMI) IN THE EMERGENCY DEPARTMENT

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Purpose: Current American Heart Association guidelines for patients with a diagnosis of ST elevation myocardial infarction (STEMI) recommend the use of an appropriate loading dose of a P2Y12 inhibitor prior to percutaneous coronary intervention (PCI). The current STEMI order set only includes clopidogrel at a lower than recommended loading dose. This study aims to improve patient outcomes by providing guideline based therapy to STEMI patients. The objective of this study is to determine whether an updated STEMI order set increases utilization of guideline based P2Y12 inhibitor loading doses in patients admitted to the emergency department with a diagnosis of STEMI. **Methods:** This study is a single center, retrospective, quality improvement study. The STEMI order set was revised in the fall of 2016 to reflect guideline recommended P2Y12 inhibitor loading doses. A medication use evaluation was conducted to identify changes in P2Y12 inhibitor usage in the emergency department three months before and three months after the implementation of an updated STEMI order set. The electronic medical record identified patients admitted through the emergency department with a diagnosis of STEMI who received a loading dose of a P2Y12 inhibitor prior to PCI. The following data was collected: age, gender, P2Y12 inhibitor chosen and dose administered. The primary outcome was the use of a guideline recommended P2Y12 inhibitor loading dose before and after implementation of the updated order set. Secondary outcomes examined the difference in usage of each individual P2Y12 inhibitor before and after the implementation of the new order set. **Results and Conclusions:** Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference

Learning Objectives:

Identify appropriate P2Y12 Inhibitor loading doses in patients presenting with STEMI undergoing PCI.

Discuss the impact of an updated STEMI order set on the use of guidelines based P2Y12 inhibitor loading doses in the emergency department.

Self Assessment Questions:

1.77 year old female is brought to the emergency department with a diagnosis of STEMI. She has a past medical history of diabetes, hypertension, hyperlipidemia, and TIA that occurred 4 years ago. The

- A Clopidogrel 300 mg once
- B Clopidogrel 600 mg once
- C Prasugrel 60 mg once
- D Ticagrelor 180 mg once

Use of a guideline based P2Y12 Inhibitor loading dose in patients diagnosed with STEMI will

- A Have no effect on patient outcomes
- B Improve patient outcomes
- C Increase length of stay
- D Decrease patient satisfaction

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-595L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF PNEUMATIC TUBE SYSTEM ON TIME TO MEDICATION ADMINISTRATION

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Purpose: Pneumatic tube systems are used in many institutions for rapid and reliable transport of medical material. Memorial Hospital of South Bend Pharmacy Department recently installed a pneumatic tube system. The objective of this study is to determine how implementation of the new tube system impacts the time from order entry to drug administration. **Methods:** This is a retrospective analysis of electronic medical records using computerized prescriber order entry and data collected for patients with medications administered in areas that utilize the tube system. Data points to be collected include: time of order placement by prescribers, time of medication verification by pharmacists, time of medication delivery via the tube system, and time of medication administration. Time frames between each step of the process will also be assessed. Data will be reviewed 90 days prior to implementation of the tube system and for the same time frame following implementation of the system. A sample of 100 STAT and NOW medications will be reviewed for each time period. Education regarding the use of the pneumatic tube system will be provided prior to staff utilization. Following education, use of the tube system will commence and data will be collected. The primary end point of this study is average time from order entry to medication administration prior to and following tube system implementation. The secondary endpoint is percentage of STAT medications administered within 60 minutes of order entry by prescribers. **Results and Conclusions:** Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe potential benefits of implementing a pneumatic tube system in a community hospital.

Identify barriers in work flow which may lengthen time from order entry to medication administration.

Self Assessment Questions:

What barriers might be present when measuring time from order entry to medication administration?

- A: Nurse unaware of medication delivery
- B: Order verification time by pharmacist
- C: Patient unavailable for medication administration
- D: All of the above

Which of the following may be a benefit of implementing a pneumatic tube system in a community hospital?

- A: Decreasing medication preparation time
- B: Increasing time of order verification by pharmacist
- C: Decreasing time to medication delivery and administration
- D: Increasing time to medication delivery and administration

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-826L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF INCIDENCE OF SEROTONIN SYNDROME FROM CONCURRENT USE OF LINEZOLID AND OPIOIDS

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Background: Serotonin syndrome, which presents with symptoms including diarrhea, fever, hyperreflexia, and/or agitation, results from excess serotonin in the peripheral and central nervous system. Serotonin syndrome may occur secondary to a number of drug-drug interactions. There are currently many studies and case reports published displaying the drug interaction between linezolid and selective serotonin reuptake inhibitors. However, the data behind the possible drug interaction between linezolid and opioids is very scarce. This study will measure and evaluate the incidence of serotonin syndrome in pediatric patients on concomitant linezolid and opioid drug therapy. **Methods:** Electronic medical records from January 1, 2010 to September 1, 2016 of hospitalized children receiving an opioid and linezolid concurrently were evaluated. Institutional IRB approval was obtained. Pediatric patients age 0-17 years who received linezolid and an opioid with monitoring periods of at least 24 hours prior to and 60 hours following the initiation of concurrent therapy were included in the study. Patients diagnosed with neuroleptic malignant syndrome were excluded. A case-crossover design was used to analyze the incidence of serotonin syndrome by comparing patients before and after concurrent drug initiation as the control and study group, respectively. The primary outcome was the incidence of serotonin syndrome defined by either Sternbach's criteria or Hunter's criteria after the initiation of a second serotonergic agent (linezolid or an opioid). Secondary outcomes included describing the impact of the total daily dose of opioid and additional serotonergic medications on incidence of serotonin syndrome and comparing highest temperatures in the control group to the study group. **Results/Conclusions:** Data collection is ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify medications that are associated with serotonin syndrome.

Describe the clinical presentation of serotonin syndrome.

Self Assessment Questions:

Which of the following antibiotics has the greatest potential to cause serotonin syndrome when used in combination with opioids?

- A: Vancomycin
- B: Daptomycin
- C: Linezolid
- D: Ceftaroline

Which of the following is a hallmark clinical manifestation of serotonin syndrome?

- A: Hypothermia
- B: Somnolence
- C: Constipation
- D: Hyperreflexia

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-854L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PHARMACOECONOMIC ANALYSIS OF THE DIAGNOSIS AND TREATMENT FOR SUSPECTED HEPARIN-INDUCED THROMBOCYTOPENIA

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Background: The treatment of suspected heparin-induced thrombocytopenia (HIT) constitutes significant healthcare costs. Delay to accurate identification of HIT is the primary cause of excessive alternative anticoagulant use in this setting. Previous internal studies have shown a significant cost associated with false positive test results, which could be averted with more streamlined diagnostic criteria. Recently published literature has also brought to light concerns associated with the predictive value of currently available diagnostic assays. The purpose of this study was to evaluate the institutional economic impact from the diagnosis and treatment of patients with suspected HIT and identify cost reduction opportunities. **Methods:** This was a single-center, retrospective, cohort analysis evaluating the costs associated with the use of argatroban for the treatment of HIT. Patients were included if they were 18 years of age or greater and received argatroban for the treatment of HIT at HFH from December 2013 to August 2016, with randomization using a random number generator. The primary endpoint was an evaluation of average cost-of-illness for patients with negative or weakly positive platelet factor 4 enzyme-linked immunosorbent assays (optical density < 1.0) compared to those with optical density ≥ 1.0 with subgroup analysis for the utilization of a confirmatory serotonin release assay. Average cost was determined from a composite of hospital, drug, and laboratory costs for each subject with planned sensitivity analysis to adjust for potential outliers. Secondary endpoints include assessment of performance characteristics for available diagnostic assays at optical density thresholds of 0.4, 1.0, and 2.0, evaluation of unnecessary treatment days, and delays in discharge. Descriptive statistics, Chi-square test for categorical data, and Mann-Whitney U test for continuous variables will be performed. **Conclusions:** Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize the controversy surrounding available diagnostic assays currently utilized for identification of heparin-induced thrombocytopenia (HIT).

Describe risk categories for patients with suspected HIT.

Self Assessment Questions:

Which diagnostic assay is currently accepted as the gold-standard for identification of HIT according to the CHEST guidelines for the treatment of HIT?

- A: Warkentin 4Ts score
- B: Serotonin release assay
- C: Platelet factor 4 enzyme-linked immunosorbent assay
- D: Optical density

What Warkentin 4Ts score is associated with an intermediate to high clinical probability of HIT diagnosis?

- A: ≤ 2
- B: 2-3
- C: ≥ 4
- D: ≥ 6

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-320L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ASSESSING CLINICAL UTILITY OF THROMBOELASTOGRAPHY (TEG) VERSUS CONVENTIONAL COAGULATION TESTS IN PATIENTS WITH CIRRHOSIS

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Purpose: Patients with advanced liver disease are known to have hemostatic abnormalities including an increased risk for both procoagulant and anticoagulant effects. Thromboelastography (TEG) provides a comprehensive assessment of hemostasis in an individual compared to conventional coagulation tests and may be more reliable than conventional tests in patients with cirrhosis. The objective of this study is to evaluate if the use of TEG influences medical management in patients with cirrhosis compared to conventional coagulation tests.

Methods: The study is a retrospective chart review of adult patients (>18 years old) with cirrhosis admitted to IUH University hospital from May 23, 2015 to September 23, 2016 who had a documented INR with or without a corresponding TEG with platelet mapping. IRB approval was granted with a waiver of informed consent. Patients were divided into two groups. Group 1 included patients who received an INR without a TEG. Group 2 included patients who received an INR and TEG but did not receive any blood products, blood factors, DDAVP or vitamin K between the INR and TEG values. Patients who received any anticoagulation therapy on admission, pregnant women, and incarcerated patients were excluded from this study. Baseline demographics including age, gender, etiology of liver disease, and MELD score on admission were collected. Patients with INRs only were matched to patients who had an INR and TEG based on disease severity, INR, and admitting diagnosis. The primary outcome includes type and amount of blood products, blood factors, or pharmacologic agents received 48 hours after receiving a TEG or INR value. Secondary outcomes include bleeding incidence, newly identified thrombus, and 28 day mortality. Discrete variables were compared by the Chi-squared test as appropriate. Continuous variables were compared by the t-test.

Results: Data collection and analysis is ongoing and will be presented in

Learning Objectives:

Identify in patients with cirrhosis, identify complications that may arise due to hemostatic abnormalities.

Relate the TEG parameters to the coagulation status of a patient.

Self Assessment Questions:

Which laboratory test provides a comprehensive assessment of hemostasis in an individual?

- A: Activated partial thromboplastin time (aPTT)
- B: International normalized ratio (INR)
- C: Platelet count
- D: Thromboelastography

Which TEG parameter correlates with the initiation of clotting factor activation?

- A: Alpha angle
- B: Lysis-30 (LY30)
- C: Maximum amplitude (MA)
- D: Reaction (R) time

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-592L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF AEROSOLIZED AND ORAL RIBAVIRIN UTILIZATION FOR THE TREATMENT OF RESPIRATORY VIRUSES IN IMMUNOCOMPROMISED HOSTS AT THE OHIO STATE UNIVERSITY WEXNER MEDICAL CENTER (OSUWMC)

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BACKGROUND Respiratory syncytial virus, metapneumovirus and parainfluenza virus are respiratory viruses known to cause upper and lower airway infections and are generally self-limited in immunocompetent adult hosts. In immunocompromised patients, however, these viruses can cause severe disease so treatment with ribavirin (RBV) may be considered in addition to providing supportive care. RBV can be administered as an aerosol or as an oral tablet, each with unique side effect considerations. It is not well elucidated whether the inhaled or oral route of administration is superior in terms of safety or efficacy in the management of these infections. The primary objective is to evaluate the use of RBV in immunocompromised patients with respiratory viral illnesses at OSUWMC and their resultant outcomes. **METHODS** RBV medication use evaluation was conducted at The Ohio State University Wexner Medical Center. A total of 90 patients were retrospectively reviewed with orders for RBV from October 2011 to September 2016. Patients age 18 to 89 receiving RBV for the treatment of a respiratory virus were eligible for evaluation. Exclusion criteria include those receiving RBV for hepatitis management, pregnancy and prisoner status. Data points to be collected include: dosing and method of administration, patient demographics, location of therapy, infectious disease (ID) consultation, the infecting viral pathogen, upper vs lower airway infection, concurrent pulmonary infection, mechanical ventilation, ribavirin-related adverse events, length of stay, ICU admission, reason for immunocompromise, white blood cell counts, serum creatinine, magnesium, hemoglobin, bilirubin, vital signs and arterial blood gas measurements, clinical success, and mortality during the examined hospital admission. Descriptive statistics will be used to characterize the population. Sub-analyses may include comparing safety and efficacy outcomes in patients receiving inhaled versus oral RBV therapy.

RESULTS/CONCLUSION Results and conclusions will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss recommendations for the use of ribavirin to treat respiratory viral illness and relevant operational and cost considerations
Review results from the ribavirin use evaluation at a large academic medical center

Self Assessment Questions:

1. Aerosolized ribavirin must be administered in a specialized tent to protect caregivers from what severe side effect?
A: Skin rash
B: Teratogenicity
C: Carcinogenicity
D: Visual disturbances
2. Clinical research best supports what positive effect of ribavirin for the treatment of respiratory viral illness in the immunocompromised?
A: Mortality benefit
B: Prevention of lung transplantation
C: Shortened duration of infection
D: Prevention of progression from upper respiratory infection to lower

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-607L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EXPANSION OF POST GRADUATE YEAR 1/2 (PGY1/2) HEALTH SYSTEM PHARMACY ADMINISTRATION RESIDENCY TO A HEALTH SYSTEM LEVEL RESIDENCY - INTEGRATING THE COMMUNITY AND ACADEMIC HOSPITAL ENVIRONMENTS

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Succession planning and talent management are greatly needed among all organizations developing future leaders. Specific to pharmacy, Sara J. Whites Harvey A.K. Whitney award lecture stated 62% of pharmacy students indicated interest in leadership positions throughout their careers. However, only 30% of pharmacists in current practice have leadership interest demonstrating the importance of engaging practitioners early on in their careers. The primary objective of this project is to restructure and expand the current Froedtert Hospital PGY1/PGY2 Health-System Pharmacy Administration Residency to a system level Froedtert & the Medical College of Wisconsin (F&MCW) administrative residency - integrating the community and academic environments into one program. With the assistance of an implementation team, the current administrative program will be re-designed and optimized to integrate the community hospital division into the 24 month PGY1/PGY2 Health-System Pharmacy Administration Residency program. The expansion process will be completed using the following methods: organized meetings, survey of pharmacy administrative team to assess the impact and satisfaction with the current PGY1/PGY2 Health-System Pharmacy Administration program, development of a business plan and program manual, analysis of salaries for CMS pass through funding, application for an ASHP expansion grant, and development of preceptors for required rotations at each site. Expected results include expansion of a current PGY1/PGY2 Health-System Pharmacy Administration Residency program to integrate community and academic hospital rotation opportunities. While acquiring a master of healthcare administration degree, residents will have the opportunity to apply and develop those skills in multiple healthcare settings. A preliminary survey of the administrative residency preceptors will gauge areas of improvement and development necessary to equip future administrative residents for practical managerial situations. The organization of the program will stem from the ideas collected. In conclusion, the integrated residency team will recruit for the Health-System Pharmacy Administration Residency program starting fall of 2018.

Learning Objectives:

Describe why development of future health-system leaders is important to the success of an organization.
Outline steps for integrating community and academic hospital rotation opportunities for a post-graduate year 1/2 (PGY1/2) health system pharmacy administration residency program

Self Assessment Questions:

- Why is expanding the PGY1/2 Health-System Administrative Residency program important to the development of future health-system leaders?
- A: Cost savings for administration
 - B: Allow room for more pharmacy administration rotations by having
 - C: Enables residents numerous opportunities to develop talents as leaders
 - D: None of the above
2. Which of the following must be addressed prior to integrating community rotations into an academic hospital program?
- A: Recruitment of health-system pharmacy administration residents
 - B: CMS Grant Application approval
 - C: Trained preceptors in multiple areas within the community division
 - D: Program Manual Additions

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-867L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

METHADONE-INDUCED QTC INTERVAL PROLONGATION IN A NARCOTIC TREATMENT CENTER: IDENTIFYING PATIENTS AT RISK AND SIMPLIFYING ECG MONITORING

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Purpose: Corrected QT (QTc) interval prolongation and torsades de pointes (TdP) are adverse events associated with methadone. Some risk factors for methadone-induced QTc interval prolongation and TdP have been identified; however, the contribution of interacting drugs and concomitant administration of other QTc-prolonging agents to risk remains unknown. One potential contributing factor is genetic polymorphisms, particularly with CYP2B6 allelic variants. Though 12-lead electrocardiograms (ECGs) may assist QTc interval monitoring in methadone-treated patients, they are time-intensive and costly. A simple handheld ECG that displays on a smartphone/iPad is available (Kardia/AliveCor) and could simplify ECG monitoring. **Methods:** Methadone-treated patients at the Eskenazi Health Midtown Narcotic Treatment Center without pretreatment QTc interval prolongation were identified. Those providing written informed consent underwent a follow-up 12-lead ECG and blood draw to determine presence of CYP2B6 allelic variants and serum methadone concentrations. A retrospective medical record review is ongoing to determine independent risk factors for QTc interval prolongation, which will be assessed using bivariate logistic regression analysis. A separate cohort of patients is being enrolled prospectively to validate the handheld ECG for measuring QTc intervals. QTc intervals from simultaneous 12-lead and handheld ECGs will be compared prior to initiation of methadone and again when the patient is on a stable dose. **Preliminary Results:** In the risk factors cohort, 90 patients were enrolled. Nearly 1/3 (28.9%) had a follow-up QTc interval > 450 ms, with one > 500 ms. Medical record reviews and blood sample analysis will identify independent risk factors for QTc interval prolongation. Fifteen patients have been enrolled in the handheld ECG device validation cohort. Enrollment is ongoing, and data will be available to present at GLPRC. **Conclusion:** Independent risk factors for QTc interval prolongation in methadone maintenance therapy will be identified and ECG monitoring may be simplified through validation of a handheld ECG.

Learning Objectives:

Outline the risk for prolongation of the heart rate-corrected QT (QTc) interval and attendant risk for Torsades de Pointes (TdP) with methadone treatment for opioid use disorder and the evidence supporting this risk

Define current guideline recommendations regarding electrocardiogram (ECG) monitoring

Self Assessment Questions:

Which of the following is true?

- A Concomitant medications do not contribute to the risk for QTc prol
- B: CYP1A2 genetic polymorphisms may contribute to risk for QTc pr
- C: CYP2B6 genetic polymorphisms may contribute to risk for QTc pr
- D: The guideline recommendations regarding ECG monitoring are co

You're a pharmacist in a methadone treatment program. You have four patients you're consulting on who have recently received prescriptions for new medications. Which patient would you be least concerned about?

- A Patient A – Paxil® (paroxetine)
- B Patient B – PrEP Therapy with Truvada® (emtricitabine/tenofovir)
- C Patient C – Verelan® (verapamil)
- D Patient D - Diflucan® (fluconazole) prophylaxis therapy

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-958L05-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

COMPARISON OF POST-INTERVENTION ANALGESIC REQUIREMENTS IN PEDIATRIC PATIENTS WITH EMPYEMA TREATED WITH FIBRINOLYTICS VERSUS VIDEO-ASSISTED THORACOSCOPIC DECORTICATION SURGERY

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Background: Empyema is a serious complication of community-acquired pneumonia in pediatric patients that is often treated with fibrinolytic instillation via chest tubes or video-assisted thoracoscopic decortication surgery (VATS). Current literature suggests that there are no significant differences in outcomes between procedures, however, there are no studies that directly compare analgesic requirements as an outcome in this patient population. The primary aim of this study is to evaluate opioid analgesic requirements over the first 72 hours post-intervention in pediatric patients with empyema treated with fibrinolytics via chest tube insertion versus VATS procedure. **Methods:** IRB approval was obtained for this single-center, retrospective cohort study. Patients ages 12 months up to 18 years old that were diagnosed with community-acquired pneumonia and pleural effusions or empyema and treated with intrapleural alteplase (tPA) or VATS between January 1, 2011 and June 30, 2016 were included. Patients were excluded for non-bacterial effusion, nosocomial pneumonia, chronic opioid medication use, or mechanical ventilation at time of intervention. The primary outcome is the comparison of the average daily dose of narcotics during the first 72 hours post intervention between the two groups. The secondary outcomes include number of daily doses of acetaminophen and NSAIDs and the requirement for VATS procedure following fibrinolytic instillation.

Results: Thirty-four patients met inclusion criteria; 19 patients in the tPA group and 15 patients in the VATS group. The average daily opioid requirement during the first 72 hours post-intervention in morphine equivalents (mg/kg/day) was 0.256 +/- 0.18 in the tPA group versus 0.967 +/- 1.6 in the VATS group. **Conclusions:** Preliminary data suggests the VATS procedure may result in a greater opioid requirement after intervention. Finalized results will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the interventions used to treat empyema in a pediatric patient. Identify potential adverse effects of opioid and non-opioid analgesics in pediatric patients.

Self Assessment Questions:

What therapy is considered the gold standard for treating empyema in pediatric patients?

- A Antibiotics
- B: Fibrinolytics instilled in chest tubes
- C: Video-assisted thoracoscopic decortication surgery
- D: No treatment is considered the gold standard

What benefit does acetaminophen or NSAIDs have over opioid analgesics for the treatment of acute pain in pediatric patients?

- A Increased sedative effects
- B Less risk of respiratory depression
- C Shorter length of hospital stay
- D Constipation

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-529L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF VTE PROPHYLAXIS IN PATIENTS STATUS POST TOTAL JOINT ARTHROPLASTY AT UIH,

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Purpose: At the University of Illinois Hospital (UIH), patients undergoing total knee arthroplasty (TKA) or total hip arthroplasty (THA) are most commonly treated with aspirin, warfarin, or fondaparinux post-operatively. The decision on which method of venous thromboembolism (VTE) prophylaxis to use is based upon the type of procedure, patient specific factors, and is ultimately up to the discretion of the physician. Despite patients being treated with guideline recommended pharmacologic agents for prophylaxis post-operatively, VTE rates remain high. This project will serve as a baseline foundation for development of an orthopedic protocol. This will benefit UIH's patient population, through the identification of areas of improvement that may be made in order to better prevent VTE events. **Methods:** This is a retrospective chart review of patients who received a TKA, THA, or a revision of either of these surgeries between 10/01/2012 and 12/31/2015. Patients were identified using ICD-9 or ICD-10 codes for these orthopedic procedures. Estimated sample size is around 400 patients. The primary objective of this study is to evaluate the appropriateness of post-operative VTE prophylaxis in TKA and THA patients based on type, time to initiation, and intended duration of prophylaxis. Secondary objectives include evaluation of clinical outcomes based on VTE events, safety based on bleeding events, and other variables that may affect outcomes based on time to mobilization and tranexamic acid utilization. **Preliminary Results and Conclusions:** Primary outcome: Of the data evaluated so far, the most commonly used pharmacologic agent for VTE prophylaxis is warfarin dosed to a goal INR of 1.8 to 2.5, followed by fondaparinux 2.5 mg daily, aspirin 325 mg twice daily, or rivaroxaban 10 mg daily. Time to initiation and duration of prophylaxis were both variable. Data collection is ongoing. Full results and conclusion will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recall current evidence and guideline recommendations for prevention of VTE events in patients undergoing total joint arthroplasty.

Recognize patient specific treatment strategies to prevent VTE in patients undergoing total joint arthroplasty.

Self Assessment Questions:

Which of the following treatment strategies is recommended as VTE prophylaxis after total joint arthroplasty?

- A: Heparin IV infusion to goal aPTT of 60 to 100
- B: Aspirin 81 mg PO daily
- C: Fondaparinux 2.5 mg SC daily
- D: Rivaroxaban 20 mg PO daily

Which of the following medications may have utility as VTE prophylaxis in orthopedic surgery patients who are thought to be at an increased risk of bleeding?

- A: Rivaroxaban
- B: Aspirin
- C: Warfarin (goal INR 2 to 3)
- D: Unfractionated heparin

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-696L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF AN ANTIMICROBIAL STEWARDSHIP INTERVENTION ON ANTIBIOTIC PRESCRIBING PRACTICES FOR COMMUNITY-ACQUIRED ACUTE UNCOMPLICATED CYSTITIS IN THE EMERGENCY DEPARTMENT

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Purpose: Urinary tract infections (UTIs) are one of the most common infections, with 75-95% of cases attributed to *Escherichia coli* (E. coli). In the emergency department (ED), UTIs are often treated prior to obtaining urine culture results. Empiric use of broad spectrum antibiotics, such as fluoroquinolones, poses concerns as antimicrobial resistance among uropathogens is increasing worldwide. The collateral damage of fluoroquinolones may outweigh their benefits in cases where alternative treatment options exist. The purpose of this study is to assess the impact of an antimicrobial stewardship intervention on antibiotic prescribing practices for community-acquired acute uncomplicated cystitis in the ED. **Methods:** A controlled quasi-experimental antimicrobial stewardship education and quality improvement intervention study in the ED at Rush University Medical Center in Chicago, Illinois. The study consists of three phases: 1) pre-intervention- historical (control) data collection (February 2016 to August 2016), 2) pharmacists provision of provider education on an ED-specific cumulative susceptibility data and empiric treatment algorithm- discussion at monthly ED department meetings, distribution of printed pocket card, email dissemination amongst ED attendings, and printed copies posted by computers of providers in all ED pods (September 2016 to October 2016), and 3) post-intervention- observational data collection (November 2016 to May 2017). Patients included are greater than or equal to 18 years of age with a diagnosis of an acute uncomplicated cystitis in the ED or discharged home within the first 72 hours from the ED with a urine culture positive for E. coli. Exclusion criteria are patients diagnosed with pyelonephritis, receipt of intravenous antibiotics, and healthcare-associated infections. The primary outcome is incidence of fluoroquinolone prescriptions before-and-after the antimicrobial stewardship intervention. Secondary outcomes include rate of E. coli susceptibility to empiric antimicrobial treatment prescribed, ED specific cumulative susceptibility report and empiric treatment algorithm adherence, and re-admission to the ED within 30 days.

Learning Objectives:

Discuss potential benefits of an emergency department specific cumulative susceptibility on E. coli urine cultures

Identify changes in prescribing practices of acute uncomplicated cystitis in the emergency department after implementation of a pharmacist driven antimicrobial stewardship intervention

Self Assessment Questions:

Which of the following is a potential benefit of an emergency department specific cumulative susceptibility on E. coli urine cultures?

- A: Useful for tracking resistance in the community
- B: Increase the comfort level of prescribers and pharmacists with the
- C: Improve therapeutic outcomes in patients
- D: All of the above

A pharmacist driven antimicrobial stewardship intervention on prescribing practices of acute uncomplicated cystitis in the emergency department result in

- A: Increased adherence to IDSA treatment guidelines for acute unco
- B: Reductions in fluoroquinolone use
- C: No impact on prescribing practices
- D: A and B

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-445L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION AND ADOPTION OF NATIONAL CONCENTRATIONS AND DOSING UNITS FOR INTRAVENOUS CONTINUOUS MEDICATIONS

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Background: Many health-systems have adopted technologies to reduce errors associated with intravenous (IV) medications. However, vulnerabilities still exist that cannot be intercepted by current technologies. These errors can arise due to variation in concentrations and dosing units within and among health care institutions. As part of a national safety initiative, Standardize-4-Safety, the American Society of Health-System Pharmacists (ASHP) has created and advocated for the adoption of national standardized concentrations and dosing units for 32 IV adult continuous infusion medications. **Purpose:** The purpose of this project is to improve patient safety by reducing variability and opportunities for IV continuous infusion errors in the medication use system and intra- and inter-health care facility transitions of care through the adoption of national concentrations and dosing units. **Methods:** A resident-led interdisciplinary workgroup was developed to implement and evaluate the impact of continuous infusion medication standardization. This workgroup considered the clinical, financial and operational impacts of adopting ASHPs standards and evaluated if adoption would meet patient care needs at UW Health. Data was collected to understand how the current concentrations and dosing units were being utilized. This data was used to predict changes to number of infusions prepared and administered per day and to understand clinician ordering preferences because these factors impact cost, staff workflow, patient care and clinician decision making. An implementation plan was developed to coordinate operational changes needed within the electronic medical record, infusion pump library, product preparation and staff education. Pre- and post-implementation data was used to analyze the impact of the changes to number and type of medication error events, utilization, and cost. The insights gained from this project will be used to develop a framework for future implementation of national standardized concentrations and dosing units for additional medication categories. **Results/Conclusion:** To be presented at the Great Lakes Resident Conference

Learning Objectives:

Describe the benefits of implementing standardized concentrations and dosing units

Identify the operational, financial and clinical considerations for implementing standardized concentrations and dosing units

Self Assessment Questions:

Which of the following measures would be most effective in reducing continuous infusion dosing errors during transitions of care?

- A: Pump settings verification during hand-offs
- B: Barcode Medication Administration
- C: Having one concentration and dosing unit across all institutions
- D: Smart Pump Technology

Which of the following is a clinical concern regarding changing IV concentration?

- A: Increase waste
- B: Affect patient's volume status
- C: Patient satisfaction
- D: Increase nursing workflow

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-940L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

TIMELINESS OF VITAMIN K ANTAGONIST REVERSAL ADMINISTRATION AFTER FORMULARY CHANGE FROM 3-FACTOR TO 4-FACTOR PROTHROMBIN COMPLEX CONCENTRATE

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PURPOSE: Warfarin has been the mainstay of oral anticoagulation therapy in the United States for over 60 years. However, bleeding is a major complication of warfarin therapy. Prothrombin complex concentrates (PCC) are concentrated, purified mixtures of human vitamin K dependent clotting factors that are used to reverse warfarin-associated bleeding. The use of PCC with intravenous vitamin K is currently recommended by clinical practice guidelines for reversal of severe, major bleeding. There are two types of PCC products available in the United States: three-factor PCC (3F-PCC) and four-factor PCC (4F-PCC). The impact of 3F-PCC versus 4F-PCC on institutional operations and time to provide care has not been previously studied. Based on preparation and administration information available in current product labeling, use of 4F-PCC instead of 3F-PCC may result in a longer time before PCC is available for patient administration. The primary objective of this quality improvement study was to determine if there is a difference in the time to administration of 3F-PCC versus 4F-PCC. **METHODS:** This study was a single-center, retrospective chart review conducted at a community teaching institution with a level one trauma center. Adult patients were included if they received either 3F-PCC from March 2015 to September 2015 or 4F-PCC from March 2016 to September 2016 for the indication of warfarin reversal. The primary outcome was time from order entry to order administration. Secondary outcomes included time from order entry to order verification, time from order verification to order administration, efficacy in reversing INR to ≤ 1.3 at the first post-treatment INR, compliance with the 10% dosing margin per hospital policy, and clinical complications including documented venous thromboembolism, myocardial infarction, cerebral vascular accident, or acute kidney injury. **RESULTS/CONCLUSION:** Final results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the compositional differences between 3-factor and 4-factor prothrombin complex concentrates

Recognize the differences in preparation and administration between 3-factor and 4-factor prothrombin complex concentrates

Self Assessment Questions:

Which of the following components are found in both 3-factor PCC and 4-factor PCC?

- A: Protein C and protein S
- B: Heparin
- C: Factor IX
- D: Antithrombin III

Which of the following explains one reason for potential increased time to care associated with 4-factor PCC when compared to 3-factor PCC?

- A: Refrigeration and thawing requirements
- B: Speed of infusion administration
- C: Specialized equipment required
- D: Pre-treatment laboratory testing

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-586L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

UTILIZATION OF RISK FACTORS TO DIRECT EMPIRICAL ANTIBIOTIC THERAPY FOR NURSING HOME PATIENTS ADMITTED TO THE MEDICAL FLOORS WITH PNEUMONIA: A PROSPECTIVE OBSERVATIONAL STUDY.

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Purpose: The most recent American Thoracic Society/Infectious Diseases Society of America guidelines for hospital acquired and ventilator associated pneumonia removed the concept of health-care associated pneumonia (HCAP) established in 2005. However, no recommendations were given for the management of these patients. At our site, a new risk factor protocol was created to help guide empiric antibiotic coverage for HCAP patients. The purpose of this study is to compare the 30 day mortality for nursing home patients with <2 risk factors from the protocol who receive ceftriaxone versus an anti-pseudomonal agent. **Methods:** This study has been submitted to the Institutional Review Board for approval. This is a prospective observational cohort study which will include patients >18 years old admitted from a nursing home with pneumonia. Patients will be included if they meet <2 of the site risk factors for multidrug resistant (MDR) gram negative pathogens. These risk factors include prior hospitalization in the last 90 days, immunosuppression, intravenous antibiotic use in last 90 days, chronic structural lung disease or history of gram negative MDR pathogens. Patients will be excluded if they are initially admitted to the intensive care unit (ICU), have a concomitant infection, were diagnosed with pneumonia >2 days after admission, or are allergic to penicillin or vancomycin. Patients will be split into those receiving ceftriaxone versus those receiving an anti-pseudomonal agent. The primary endpoint will be 30 day mortality and the secondary endpoints will include 30 day readmission, incidence of Clostridium difficile within 30 days, incidence of isolated MDR pathogens, length of stay, transfer to the ICU, and ICU length of stay. **Results:** This research is currently in the data collection phase. **Conclusion:** This research is currently in the data collection phase. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review the recent update in the American Thoracic Society/Infectious Diseases Society of America guidelines for HAP/VAP from July 2016. Identify the HCAP criteria established in 2005 by American Thoracic Society/Infectious Diseases Society of America

Self Assessment Questions:

Which of the following was not included in the recent American Thoracic Society/Infectious Diseases Society of America guidelines for HAP/VAP from July 2016?

- A: The use of empiric double pseudomonas coverage
- B: Recommendations for treatment of health care associated pneumonia
- C: The use of site specific antibiograms to guide empiric therapy
- D: De-escalation based on culture results

Which of the following is included in the HCAP criteria established in 2005?

- A: Proton pump inhibitor use
- B: Oral antibiotic use in the last 90 days
- C: Chronic structural lung disease
- D: Prior hospitalization >2 days in the last 90 days

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-534L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPROVING CHEMOTHERAPY PROCESSING WORKFLOW AT A VETERANS AFFAIRS MEDICAL CENTER UTILIZING LEAN PROCESS IMPROVEMENT TECHNIQUES

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Purpose: The process to evaluate, verify, prepare, and dispense chemotherapy is complex and requires effective communication in conjunction with a clearly defined and efficient workflow. In July 2014, VistA Chemotherapy Manager (VCM), a chemotherapy ordering software program, was implemented at the Indianapolis VA Medical Center in an effort to streamline the ordering process and improve patient safety. The introduction of VCM necessitated changes to the existing pharmacy chemotherapy workflow. The current process has resulted in reported frustrations of both nursing and pharmacy which has ultimately led to delays in chemotherapy administration to veterans. The aim of the project is to identify barriers within the current pharmacy workflow and communication between departments and implement solutions to improve efficiency of the chemotherapy treatment process for veterans. **Methods:** The current state of the pharmacy chemotherapy workflow was mapped and the ideal state was determined. Barriers to achieving the ideal state were identified and analyzed. Solutions to barriers were developed and implemented to improve communication and efficiency of the workflow process. Metrics monitored included incident reports and time studies of various steps in the workflow process. Data collection for the time studies was performed by a review of the VA Medical Centers VCM, Decentralized Hospital Computer Program (DHCP), and Computerized Patient Record System (CPRS). The data will be evaluated at baseline and post implementation of the proposed improvements to determine success of the project. **Results and Conclusions:** Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify the most common barriers associated with the current state of the pharmacy chemotherapy workflow at the Roudebush VA Medical Center.

Discuss the rapid experiments implemented to improve the pharmacy chemotherapy workflow and communication between departments.

Self Assessment Questions:

Based on the project, what is a common barrier associated with the current state of the pharmacy chemotherapy workflow at the Roudebush VA Medical Center?

- A: Patient weight questions
- B: Provider not signing orders
- C: Patient reporting to clinic on wrong day
- D: Chemotherapy on backorder

What was a rapid experiment implemented to improve the communication between pharmacy and nursing?

- A: Pharmacists were given pagers
- B: Nurses were given pagers
- C: Nurses were given Cisco phone
- D: Lync group messaging

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-888L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

A SURVEY OF HEART FAILURE PATIENTS ON THEIR DISEASE STATE KNOWLEDGE AND PERCEPTIONS OF PHARMACISTS ABILITY TO IMPACT HEART FAILURE SELF-MANAGEMENT SKILLS IN A COMMUNITY PHARMACY SETTING

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Purpose: The American Heart Association estimates that 70% of heart failure (HF) patients are aware they have a HF diagnosis and 54% are able to identify symptoms of worsening HF. The objective of this study is to determine the awareness of HF diagnosis and recognition of symptoms and self-management techniques among patients with HF in the community pharmacy setting. A secondary objective is to assess HF patients perceptions of community pharmacists ability to provide comprehensive HF education and improve self-management skills. The accessibility of community pharmacists affords the opportunity to identify patients with worsening HF and ensure they receive care in a timely manner. **Methods:** A prospective, multi-site, survey-based study is being conducted at three grocery store community pharmacies in the Chicagoland area. Patients 18 years of age and older who have filled more than one prescription for furosemide, bumetanide, torsemide or metolazone, and more than one prescription for any secondary medication supporting the diagnosis of HF within the preceding year were included. Secondary medications supporting the diagnosis of HF include the beta-blockers, carvedilol, carvedilol CR, metoprolol succinate, and bisoprolol, angiotensin-converting enzyme inhibitors, angiotensin II receptor blockers, angiotensin II receptor-neprilysin inhibitors, and aldosterone antagonists. Patients with any filled prescription for propranolol, nadolol, lactulose or rifaximin were excluded to omit those with alcohol liver disease. Eligible patients were identified using dispensing reports for National Drug Codes corresponding to aforementioned diuretics. Using a standardized interaction script, patients or patients representatives were presented with a modified version of a previously-validated HF knowledge survey to be completed anonymously. This 5-7-minute survey was designed to identify patients that are unaware of their HF diagnosis, as well as meet other study objectives, and will be analyzed per a prespecified protocol. Descriptive statistics will be used to report results. **Results:** Research is in progress. **Conclusions:** To be presented at the conference.

Learning Objectives:

Describe the impact of heart failure on morbidity and mortality in the United States.

Discuss the current level of disease state knowledge among patients with heart failure and its implications in clinical practice.

Self Assessment Questions:

Which of the following is true regarding morbidity and mortality in heart failure?

- A Approximately every 1 in 9 hospitalizations include heart failure as
- B: Approximately 25% of patients die within the 5 years following heart failure
- C: More than 50% of patients are readmitted within the six months following heart failure
- D: The total annual cost of heart failure is approximately \$17 billion.

According to the American Heart Association, approximately what percent of patients can correctly identify their heart failure symptoms?

- A 80%
- B 70%
- C 60%
- D 50%

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-513L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

TIMING, FREQUENCY, AND PRECIPITATING FACTORS OF EARLY READMISSION AFTER HEART TRANSPLANT

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PURPOSE: Early hospital readmission after organ transplantation, defined as readmission within 30 days of discharge, has been found to be associated with increased morbidity and mortality. This study aimed to determine the timing, frequency, etiology and patterns of 30-day readmissions among heart transplant recipients, as well as to determine whether there were significant predictors of readmission or effects on survival. **METHODS:** A single-center, retrospective study. From January 2008 through September 2015, 209 patients underwent heart transplantation. A total of 18 patients died before discharge and were excluded from our analysis. Numerous pre-transplant variables and post-operative complications were compared using 2-sided t-tests and chi-square tests between patients who were and were not readmitted within 30 days of their discharge after transplantation. **RESULTS:** 191 heart transplant recipients were included in the analysis, 78% (n=148) were male, 47% (n=90) were Caucasian, 38% (n=72) were African American. The average age was 55 years. Early readmission within 30 days occurred in 28% of patients with a total of 59 early readmissions occurring in 53 patients. Rejection (25%), infection (12%), acute kidney injury (9%), gastrointestinal complications (9%), and hyperglycemia (7%) were the most common causes of early readmission. The median readmission length of stay was 11 days (range 1-147). 117 patients (61%) experienced at least 1 readmission within the first-year post-transplant accounting for a total of 273 readmissions. The 1-year post-transplant mortality rate was found to be 6% (n=11); early readmission did not affect 1-year mortality. **CONCLUSIONS:** Our experience indicates that the 30-day readmission rate after heart transplant is 28%, which is keeping with previous studies of other organ groups. Rejection and infection were the most common causes of post-transplant rehospitalization.

Learning Objectives:

Identify the most common causes of early readmission post-heart transplantation.

Describe the rate of 30-day readmissions after heart transplantation.

Self Assessment Questions:

Which of the following was identified as the most common cause of early readmission post-heart transplantation?

- A Infection
- B: Rejection
- C: Acute Kidney Injury
- D: Gastrointestinal complications

What was the observed rate of early readmissions after heart transplantation?

- A 10%
- B 16%
- C 28%
- D 33%

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-693L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

OPTIMIZING INITIAL EMPIRIC ANTIBIOTIC THERAPY TIMING AND ADMINISTRATION AMONG PATIENTS IN THE EMERGENCY DEPARTMENT

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Purpose: The Surviving Sepsis Campaign has identified the administration of broad-spectrum antibiotic therapy within one hour of the recognition of septic shock and severe sepsis as the goal of therapy to improve outcomes and reduce mortality. Similarly, the Centers for Medicare and Medicaid (CMS) quality measures dictate that antibiotics be administered within three hours of the identification of severe sepsis or septic shock. The purpose of this study is to evaluate if Gundersen Lutheran Medical Center is meeting this goal of timing for antibiotic administration and to identify any potential barriers or trends that are preventing this from being accomplished. **Methods:** Approval was obtained from the Institutional Review Board for retrospective chart review and data collection. Patients admitted to Gundersen Lutheran Medical Center through the emergency department with a diagnosis of sepsis or septic shock from July 2015-July 2016 were included in the study. Patients were identified via electronic health record documentation of ICD-9 and ICD-10 codes. Exclusion criteria included patients transferred from another facility or patients diagnosed with sepsis during the course of their hospitalization. The data collected incorporated the following: age, antibiotic-related allergies, suspected source of infection, time from determination of suspected sepsis to administration of antibiotic, availability of antibiotic from the automated dispensing system, incompatibility of antibiotics, and antibiotics ordered and administered. Data from patients who did not receive antibiotics within the desired three hour window were analyzed to determine potential barriers to treatment. **Results:** Data collection is ongoing. Results and conclusions will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize benefits of initiating appropriate empiric antibiotic therapy promptly after the diagnosis of sepsis is suspected.

List the three criteria that comprise the quick sepsis-related organ failure assessment (qSOFA) score to identify patients with suspected infection.

Self Assessment Questions:

Which of the following is a benefit of early initiation of antibiotic therapy for patients with sepsis?

- A: Decreased need for vasopressors
- B: Decreased risk of readmission
- C: Decreased mortality
- D: Increased length of hospital stay

Which of these is a part of the qSOFA score?

- A: Altered mental status
- B: Need for fluid boluses
- C: Hypertension
- D: Life threatening organ dysfunction

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-309L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF OPIOID DRUG ALLERGY ALERTS AT AN ACADEMIC MEDICAL CENTER

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PURPOSE Opioid analgesics are among the most common medications to trigger drug allergy (DA) alerts. Opioids also have one of the highest alert override rates with ranges between 80-95% reported in the literature. Allergies to opioid medications are a common patient complaint, however true immune-mediated allergic reactions to opioids are rare. Patients more commonly report less severe reactions such as known drug side effects or pseudoallergies. The effectiveness of opioid DA alerts is complicated by the misclassification and documentation of known opioid side effects, intolerances, or pseudoallergies as true drug allergies. Opioid analgesics are commonly prescribed medications within The Ohio State University Wexner Medical Center (OSUWMC). It is imperative that our clinical decision support (CDS) mechanisms for opioid DA alerts are optimized in order to maximize patient safety and minimize clinician alert fatigue. The primary objective of this medication use evaluation (MUE) is to assess the impact of opioid DA alerts on safe prescribing. **METHODS** A medication use evaluation (MUE) using retrospective chart review of 50 patient encounters resulting in 167 opioid DA alerts was completed. The qualifying patients were generated through a detailed medication warning report including all inpatient opioid DA alerts at The OSUWMC for the month of August 2016. The resulting opioid DA alerts were randomized by patient order identification number and selected for review using a number generator website. The selected encounters were evaluated for their impact on safe prescribing using descriptive statistics. **RESULTS/CONCLUSION** Data collection and analysis is ongoing. Results and conclusions will be presented at Great Lakes Pharmacy Resident Conference in April 2017.

Learning Objectives:

Identify the difference between an opioid medication side effect, pseudoallergy, and true immune-mediated allergic reaction

Identify strategies to help reduce your institution's overall opioid allergy alert burden

Self Assessment Questions:

Which of the following represent opioid reactions that can be classified as pseudoallergy only?

- A: Nausea, vomiting, itching, hives
- B: Itching, flushing, sweating
- C: Itching, sweating, severe hypotension
- D: Hives, tachycardia, mild hypotension, itching

Which of the following most accurately reflects a potential strategy to decrease your institution's overall opioid allergy alert burden as discussed in this presentation?

- A: Establish focused opioid drug allergy education for staff only
- B: Transition all opioid allergy alerts to non-interruptive
- C: Standardize the process for opioid drug allergy documentation
- D: Establish focused opioid drug allergy education for patients only

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-946L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ASSOCIATION OF RAPID IDENTIFICATION AND PHARMACIST INTERVENTION ON THE MORTALITY OF PATIENTS WITH BLOODSTREAM INFECTIONS IN A COMMUNITY TEACHING HOSPITAL

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Purpose: Bloodstream infections have been associated with a high mortality rate and an extended hospital length of stay. Several studies have shown that the use of rapid diagnostic tests when coupled with real time intervention from a pharmacist improves patient outcomes and decreases health-system costs. The majority of this data stems from large academic institutions with ample laboratory and pharmacy services. The purpose of this study is to determine the impact of rapid identification and pharmacist intervention on patients with bloodstream infections on improving patient outcomes and decreasing health-system costs within a community teaching hospital. **Methods:** A process for pharmacists to analyze and report positive blood cultures to the primary treatment team was created. Pharmacists were also notified of the results of a multiplex PCR system (BioFire FilmArray) so that antimicrobial regimens could be optimized via an institution specific algorithm. To be included in the study, patients must be at least eighteen years of age with at least one positive blood culture. Patients with the following characteristics were excluded from the study: less than eighteen years of age, pregnancy, polymicrobial blood cultures, active hospice/palliative care consult, known culture results at the time of admission, or history of solid organ/hematopoietic stem cell transplant. The primary endpoint of the study was in-hospital mortality. Secondary endpoints included: hospital length of stay, intensive care length of stay, cost of hospital stay, time to effective antimicrobial therapy, time to optimal antimicrobial therapy, and thirty day readmission rate. Patients with at least one positive blood culture prior to the implementation of the new protocol were retrospectively selected as the control arm. Patients after the implementation of the rapid identification protocol were retrospectively selected as the intervention arm. **Results & Conclusion:** Final results

Learning Objectives:

Explain how rapid diagnostics can be used in the treatment of bloodstream infections to improve patient outcomes

Describe the impact of multiplex PCR technology and pharmacist intervention on patients with bloodstream infections at a community teaching hospital

Self Assessment Questions:

Which of the following statements best describes how rapid diagnostic tests (RDTs) can be utilized in the treatment of bloodstream infections?

- A: Most RDTs help to identify pathogens and known resistance mechanisms
- B: Most RDTs help to provide antimicrobial susceptibilities to the patient
- C: Most RDTs help to distinguish between bacterial and viral infection
- D: Most RDTs help to by drastically decreasing the time needed to get results

Which of the following statements is the most true regarding the impact of using rapid diagnostic tests (RDTs) for the management of bloodstream infections?

- A: RDTs paired with active clinician intervention have been shown to improve outcomes
- B: RDTs alone without active clinician intervention have been shown to improve outcomes
- C: RDTs paired with active clinician intervention have been shown to improve outcomes
- D: RDTs alone without active clinician intervention have been shown to improve outcomes

Q1 Answer: A Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-311L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION OF STRATEGIES TO REDUCE TARGETED READMISSIONS AT A COMMUNITY TEACHING HOSPITAL

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Purpose: The primary objectives of this study were to evaluate causes and decrease readmissions for diagnoses which are part of the Centers for Medicare & Medicaid Services Hospital Readmissions Reduction Program. Readmissions for these diagnoses result in reduced hospital payments and penalties. Institution-specific readmission rates for congestive heart failure, pneumonia, chronic obstructive pulmonary disease, acute myocardial infarction, and hip or knee arthroplasty were used to implement strategies to prevent readmissions from a pharmacy perspective. Patients with the highest number of readmission risk factors were analyzed to develop a scoring tool to highlight future patients at risk and to develop these readmission reduction strategies. **Methods:** This retrospective data collection study was approved by the Institutional Review Board. Patients with an unplanned readmission for the same primary diagnosis, as identified by ICD-10 codes and diagnosis-related groups in electronic medical records, within 30 days after discharge were included. Patients were excluded if: the patient expired, the patient was discharged after the study time period, the readmission was for an acute medical illness, it was an elective readmission, or the readmission occurred at a different hospital. Historical control group data were collected from October 1, 2015 to June 30, 2016 and will be compared with post risk factor tool implementation data collected from October 1, 2016 to February 28, 2017; with a maximum of 100 patients in each group. Primary outcomes included: number of patients readmitted for targeted diagnoses, risk factors for readmissions, and causes of avoidable readmissions. The secondary outcome evaluated the readmission cost in terms of length of stay. The risk factor scoring tool was created and pharmacist in-services were provided so that additional patient medication education could be provided and clinical interventions could be made to prevent future readmissions. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the diagnoses which are part of the Centers for Medicare & Medicaid Services Hospital Readmissions Reduction Program.

Define what Centers for Medicare & Medicaid Services considers to be a readmission.

Self Assessment Questions:

Which diagnosis is part of the Centers for Medicare & Medicaid Services Hospital Readmissions Reduction Program?

- A: Heart failure
- B: Asthma
- C: Deep vein thrombosis
- D: Sepsis

How many days after discharge from an index admission is the next hospital visit considered a readmission for the same diagnosis?

- A: 20 days
- B: 25 days
- C: 30 days
- D: 35 days

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-720L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATING THE IMPACT OF COMMUNITY PHARMACIST INTERVENTIONS ON CLINICAL SYMPTOM SCORES IN PATIENTS WITH DEPRESSION AND/OR ANXIETY

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Purpose: It has become commonplace for community pharmacists to teach wellness classes, offer health screenings, and provide medication therapy management (MTM) services for a variety of disease states. However, limited literature exists currently assessing community pharmacists involvement in psychiatric care. Thus, the primary objective of this research study is to determine the impact community pharmacist-led interventions make on clinical symptom scores for patients diagnosed with depression and/or anxiety. Secondary objectives include identifying potential barriers to the patients medication therapies and psychiatric care; as well as examining pharmacist intervention types and responses of health care providers to a pharmacist-led depression and anxiety screening. **Methods:** This prospective research study was conducted in an outpatient pharmacy in an academic hospital setting. A community pharmacist performed an initial Patient Health Questionnaire (PHQ-9) and Generalized Anxiety Disorder 7-item scale (GAD-7) for patients aged 18 years or older that were prescribed medications for depression and/or anxiety. Patients with PHQ-9 score greater than 5 and/or GAD-7 score greater than 10, completed a de-identified questionnaire that will include demographic information, history of depression and/or anxiety diagnoses, and possible barriers to access health care or medications. Therapeutic interventions by the pharmacist were recorded and escalated to prescribers when appropriate. Interventions included but were not limited to dose titration, side effect management, adherence counseling, cost savings, and escalation to psychiatric care. All participants were scheduled for a 6-week follow-up telephone or in-person appointment with the community pharmacist to re-administer the PHQ-9 and GAD-7 questionnaires. Any changes from baseline assessment were recorded. **Results/Conclusion:** Results and conclusion will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the barriers for patients to access quality mental health care. Indicate the severity of depression and anxiety based on clinical symptom scores.

Self Assessment Questions:

Which of the following are potential barriers for patients to access mental health care?

- A Social stigma of mental illnesses
- B: Affordability of mental health care
- C: Shortage of psychiatric health care providers
- D: All of the above

A patient presents to a community pharmacy to pick up a refill for his medication for generalized anxiety disorder. He scores 14 on the Generalized Anxiety Disorder 7-item scale (GAD-7). What anxiety

- A Mild
- B Moderate
- C Moderately severe
- D Severe

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-868L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF PHARMACIST-RUN ANNUAL WELLNESS VISITS IN A PRIVATE PHYSICIANS OFFICE

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Purpose: The goal of this study is to implement a process for pharmacist-run Medicare Annual Wellness Visits (AWV) and assess cost revenue for a private family practice clinic. In addition, time saved for the physician and types and number of pharmacist medication interventions will be evaluated. **Methods:** The study was submitted to the Institutional Review Board and received approval. At the current clinic site, the physician is currently performing all wellness visits. The clinic currently has approximately 500 Medicare patients that qualify for these visits. Referrals of these patients to the pharmacy service will be obtained by the primary physician. Education and a process will be developed prior to seeing patients in order for the physician to appropriately refer patients she selects to this service. A pharmacist currently works at this site and would qualify under Medicare rules to perform AWVs. Several low risk assessments will be performed during an AWV that all pose no risk to the patient. These assessments include: A health risk assessment will be conducted through a patient form to identify health behaviors and risk factors for different diseases. A patient history will be collected that will include: family history, past medical history, allergies, medications, and a provider list. Three paper form tests will be conducted to review risk factors for dementia and depression (PHQ-2, PHQ-9, and Mini Cognitive test). A physical assessment will be done including: patient height, weight, body mass index (BMI), blood pressure, pulse, and respiratory rate. A vaccination history assessment will be done and appropriate vaccinations will be given. Finally, we will provide personalized health advice to the patient and provide referrals as appropriate. **Results:** Data is currently being collected and will be presented at The Great Lakes

Learning Objectives:

Define the purpose of an Annual Wellness Visit.

Recognize the role of a pharmacist in conducting Annual Wellness Visits and where they can make the most impact.

Self Assessment Questions:

What is the purpose of an Annual Wellness Visit?

- A To provide the patient with an annual physical
- B: To provide the patient with a personal assessment of beneficial pr
- C: To provide the patient with a comprehensive medication list
- D: To assist patients with choosing the best insurance plan

Which of the following components of the annual wellness visit can pharmacists make the most impact?

- A Medication reconciliation
- B Obtaining vitals
- C Detecting cognitive impairment
- D Obtaining beneficiary history

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-869L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

INCIDENCE OF HYPERGLYCEMIA IN PATIENTS ON TOTAL PARENTERAL NUTRITION (TPN) AT THE CINCINNATI VAMC

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PURPOSE: Studies have shown that patients who receive TPN have a higher incidence of hyperglycemia (the range is anywhere from 10 to 88%) regardless of their diabetes status. There are multiple mechanisms that contribute to hyperglycemia during nutrition support. During the stress of hospitalization and by simply being bedridden, patients experience increased gluconeogenesis, diminished insulin signaling, and a decrease in glucose utilization by peripheral tissues. Additionally, acute illness, surgery, or trauma can cause the body to release stress mediators (e.g., hormones and cytokines), which interfere with the metabolism of carbohydrates. Studies have also shown that receiving TPN has been independently associated with higher rates of hospital complications, length of stay, and even mortality. The primary objective of this review is to identify the incidence of hyperglycemia in patients who are on TPN at the Cincinnati VAMC between June 1, 2015 and May 31, 2016. **METHODS:** This is a retrospective chart review. The VA's electronic medical record will be utilized to identify patients who have received TPN from June 1, 2015 through May 31, 2016 (n=42). The following data will be collected: age, gender, pre-existing diabetes diagnosis, most recent A1c, home dose of insulin, units of insulin 24 hours prior to TPN, units of insulin per 24 hours while on TPN, blood glucose levels (baseline, 24 hours prior to TPN administration, and median blood glucose while on TPN), number of blood glucose readings <70 mg/dL, number of blood glucose readings <50 mg/dL, amount of dextrose in TPN, number of days on TPN, glucocorticoid use within the past 14 days, amount of dextrose from other sources. From this information, descriptive statistics will be used to identify the incidence of hyperglycemia in patients on TPN at the Cincinnati VA. **RESULTS/CONCLUSIONS:** Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Explain the mechanism for hyperglycemia in patients receiving Total Parenteral Nutrition (TPN).

Discuss possible consequences of hyperglycemia and its impact on patient outcomes.

Self Assessment Questions:

Which of the following statements is correct?

- A Hyperglycemia while on TPN occurs only in diabetics.
- B: An appropriate blood glucose goal range in critically ill patients is 7
- C: The development of hyperglycemia while on TPN has been associated
- D: Surgery, trauma, and an increase in stress hormones can all contribute

According to a study by Pasquel et al. in 2010, blood glucose levels greater than 180 mg/dL within 24 hours of TPN initiation was associated with an increased risk of which of the following:

- A Pneumonia
- B Acidosis
- C Acute renal failure
- D A & C only

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-883L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PREVALENCE AND CLINICAL FEATURES OF CARBAPENEM-ONLY SUSCEPTIBLE ORGANISMS AFTER ESCALATION OF ANTIBIOTIC THERAPY IN HOSPITALIZED PATIENTS

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Purpose. Managing multi-drug resistant (MDR) Gram-negative bacteria continues to be a challenge. Carbapenems are effective treatment options against these bacteria; however, escalation to a carbapenem for broader empiric therapy may not always be judicious and could potentially lead to selection for carbapenemase-producing pathogens. Antimicrobial stewardship programs (ASP) play a major role in promoting appropriate carbapenem use. In the absence of microbiological data, ASP is often compelled to approve pre-authorization requests for escalation to a carbapenem due to the patients' tenuous clinical status and risk for MDR Gram-negative bacteria. The objectives of this study are to determine the prevalence and clinical features of carbapenem-only susceptible organisms in patients escalated from broad-spectrum antibiotics to carbapenems. **Methods.** A retrospective chart review of all carbapenem order requests in hospitalized adult patients while on at least 72 hours of broad-spectrum antibiotics between 2013 and 2016. Cases will be excluded if a carbapenem is requested for, 1) a documented infection during the same hospital stay, 2) perioperative prophylaxis, 3) documented penicillin allergy, and 4) deterring drug-drug interactions. Electronic medical and pharmacy records will be reviewed for collection of demographics, source of admission, recent antimicrobial history, etc. Prevalence will be calculated as the number of cases of carbapenem-only susceptible isolates per population at risk in a given time period. Characterization of clinical features of infection within 72 hours of carbapenem order placed will include, if applicable, duration of fever, sepsis, hospital stay and intensive care unit stay. Descriptive statistics and univariate logistic regression will be performed to determine risk factors. **Results/Discussion.** The prevalence of carbapenem-only susceptible organisms will be calculated and clinical features of these infections will be reported and discussed at Great Lakes Conference.

Learning Objectives:

Describe risk factors associated with carbapenem-only susceptible organisms, including ESBL-producing Enterobacteriaceae

Identify situations in which it may be appropriate and judicious to empirically escalate broad-spectrum antibiotics to carbapenems

Self Assessment Questions:

Which of the following risk factors are associated with ESBL-producing Enterobacteriaceae?

- A Recent 3rd generation cephalosporin use
- B: Recent fluoroquinolone use
- C: Recent hospitalization
- D: All of the above

JR is a 68-year-old male from a nursing home with past medical history of type 2 diabetes, hypertension, chronic kidney disease stage IV, and has a urinary catheter who presents with fever and chills

- A Patient received after one dose of vancomycin and piperacillin/taz
- B Blood cultures with growth of gram positive cocci in pairs and chain
- C Patient presents new development of high fevers and clinical insta
- D Patient with a documented history of penicillin allergy, identified as

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-368L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

OUTCOMES IN THE TREATMENT OF SECONDARY ACUTE MYELOID LEUKEMIA: A COMPARISON OF FLAG VS. OTHER INDUCTION STRATEGIES

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Purpose: Treatment outcomes in secondary acute myeloid leukemia (sAML) are poor, as these patients respond poorly to conventional chemotherapy and frequently experience treatment-related morbidity and mortality. Despite the dismal prognosis, progress has been stagnant, and the standard of care for sAML remains the same as that of de novo AML, which consists of an anthracycline plus cytarabine (3 + 7). There is currently no literature comparing various induction regimens in patients with sAML and no evidence to suggest that outcomes can be improved beyond 3+7. Anecdotally, our institution has experienced favorable responses and excellent tolerability with the high-dose cytarabine-based regimen, FLAG. Thus, the purpose of this study is to compare complete remission rates, long-term efficacy outcomes, and treatment-related morbidity and mortality of FLAG to other regimens in the induction of sAML. **Methods:** A retrospective study will be conducted in adult patients with sAML who were treated with various induction chemotherapy regimens at Michigan Medicine from January 2006 to September 2016. Data to be collected include baseline demographic and disease characteristics (WBC count, blast percentage, cytogenetic abnormalities, etc), induction chemotherapy regimen received, response rate (complete remission or complete remission with incomplete hematologic recovery), treatment-related morbidity (bacteremia, neutropenic fever), hospital length of stay, intensive care unit (ICU) admission, ICU length of stay, disease progression, and mortality. Propensity score matching will be utilized to minimize bias between cohorts. Chi-square and Fisher exact tests will assess categorical variables, while the student's paired t-test and Mann-Whitney U test will assess continuous variables. Furthermore, time-to-event analyses for the secondary endpoints, including progression-free survival and overall survival, will be performed using the Kaplan Meier method. **Results:** In process **Conclusion:** In process

Learning Objectives:

List risk factors for the development of secondary acute myeloid leukemia.

Discuss treatment options for the induction of secondary acute myeloid leukemia.

Self Assessment Questions:

Which of the following may give rise to secondary acute myeloid leukemia?

- A Radiation therapy
- B: Myelodysplastic syndrome
- C: Topoisomerase II inhibitors
- D: All of the above

What is the current standard of care for secondary acute myeloid leukemia induction?

- A Decitabine
- B Flag
- C 3+7
- D Clinical trial

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-388L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DEFINING THE ROLE OF A CLINICAL PHARMACIST IN AN INTEGRATED HEART AND VASCULAR CLINIC

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Purpose: Peripheral arterial disease (PAD) affects eight to twelve million patients in the United States and its prevalence is expected to continue to increase as the population ages. In addition to peripheral ischemia and potential loss of limb, patients with PAD have a three to six fold increased cardiovascular mortality compared to patients without PAD. Current PAD guidelines focus on optimal management of modifiable risk factors, including tobacco use, hypertension, diabetes, and hypercholesterolemia. While data exists to validate the role of a clinical pharmacist in the management of cardiovascular disease risk factors among outpatients with CAD, limited data is available to support the role of the clinical pharmacists in improving risk factor management in patients with PAD. The purpose of this study is to describe the role of the clinical pharmacist in the management of patients with established atherosclerotic disease or risk factors for atherosclerosis seen in the Integrated Vascular Clinic. **Methods:** This is a retrospective single-center study at an academic medical center outpatient integrated heart and vascular clinic. Patients were identified for this study if they were seen in the Integrated Vascular Clinic from October 1, 2016 through February 28, 2017. This study included patients ≥ 18 years of age with established atherosclerotic disease or at least 3 risk factors for atherosclerotic disease. The primary outcomes of this study were the proportion of patient encounters for which the pharmacist intervened, the average number of interventions per patient encounter, and reason for intervention. Secondary outcomes included the types of interventions implemented by the pharmacist, proportion of accepted interventions, proportion of pharmacy team follow-ups after initial visit, and proportion of patients at goal on follow-up. Primary and secondary outcomes were analyzed using descriptive statistics. **Results /Conclusions:** Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify the modifiable risk factors for peripheral arterial disease.

Describe the role of a clinical pharmacist in an integrated heart and vascular clinic.

Self Assessment Questions:

Current peripheral arterial disease guidelines focus on the optimal management of modifiable risk factors, which include:

- A Age, hypertension, diabetes, hypercholesterolemia
- B: Hypercholesterolemia, diabetes, tobacco use, hypertension
- C: Hypercholesterolemia, diabetes, tobacco use, hypertension
- D: Tobacco use, hypertension, race, diabetes

A clinical pharmacist in an interdisciplinary integrated heart and vascular clinic can add value through which of the following interventions?

- A Patient education
- B Recommend a change of therapy
- C Monitoring of drug therapy
- D All of the above

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-669L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ANALYSIS OF TIME TO ANTIBIOTIC ADMINISTRATION IN ADULT FEBRILE NEUTROPENIC PATIENTS IN A HOSPITAL EMERGENCY DEPARTMENT

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Purpose: In cancer patients with chemotherapy-induced neutropenia, fevers may be the only indicator of a severe infection due to the reduced signs and symptoms of an inflammatory response. The American Society of Clinical Oncology (ASCO) recommends that febrile neutropenic patients should receive initial doses of empiric antibiotics within one hour of triage. The objective of this study is to determine the current time to antibiotic administration (TTA) in febrile neutropenic patients who present to the emergency department. This information will ultimately be used to optimize empiric antibiotic administration and decrease TTA. **Methods:** This study has been submitted and approved by the institutional review board. It is a retrospective chart review of cancer patients age 18 or older who initially presented to the emergency department at Riverside Methodist Hospital, were recently treated with chemotherapy, and have laboratory confirmed febrile neutropenia [absolute neutrophil count (ANC) of less than 1000 cells/mm³, and a fever with a temperature greater than or equal to 38.0°C] between May 1, 2015 and March 31, 2017. The primary objective will be to determine the average time to antibiotic administration in febrile neutropenic patients from time of presentation to the emergency department with a goal of 60 minutes or less. Data collection will include determining average time intervals leading up to antibiotic administration (from ED registration to being seen by a physician, blood draws, antibiotic order placement, antibiotic order placement to pharmacist verification, and pharmacist verification to administration). Other outcomes of interest will include proportion of patients that utilized the febrile neutropenia order set, hospital length of stay, and inpatient deaths in patients that met the treatment goal of 60 minutes or less and those who did not. **Results/Conclusions:** Data collection and analysis is ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss appropriate first-line antibiotic options in cancer patients who present with febrile neutropenia following chemotherapy

Review the current recommendation from the American Society of Clinical Oncology in regards to time to antibiotic administration in febrile neutropenic patients

Self Assessment Questions:

Which of the following antibiotics would be an appropriate first-line option in a cancer patient who presents to the emergency department with febrile neutropenia?

- A Doxycycline
- B: Ampicillin/Sulbactam
- C: Cefepime
- D: Ceftaroline

According to ASCO, what is the recommended time to initial antibacterial therapy in febrile neutropenic patients?

- A 60 minutes
- B 45 minutes
- C 90 minutes
- D 4 hours

Q1 Answer: C Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-418L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

RETROSPECTIVE REVIEW OF PATIENTS PRESENTING TO A RURAL COMMUNITY TEACHING HOSPITAL WITH INTRACEREBRAL OR GASTROINTESTINAL BLEEDING SECONDARY TO ANTICOAGULATION

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Purpose: Major bleeds are often secondary to, or complicated by, concomitant use of anticoagulant therapy. In-hospital pharmacologic interventions for anticoagulation reversal at St. Claire Regional Medical Center (SCRMC) are currently limited to the administration of the following agents: protamine, phytonadione and fresh frozen plasma (FFP). At the time of this study, the current guidelines regarding evidence based management of anticoagulation recommend the use of four factor prothrombin complex concentrate (PCC) for the emergent reversal of vitamin K antagonists in patients who present with major bleeding. Similarly, idarucizumab offers anticoagulation reversal for dabigatran. In the future, if approved, andexanet alpha may offer a unique reversal option for patients taking fondaparinux, rivaroxaban, apixaban or edoxaban. Results of a retrospective review may provide insight into the treatment of anticoagulated patients presenting with major bleeding, as well as lead to formulary changes that could optimize our management of these patients in the future. It is the purpose of this study to review the interventions utilized, and outcomes, of anticoagulated patients presenting with major bleeds. **Methods:** A retrospective chart review was conducted of adult patients who presented with a major intracerebral or gastrointestinal bleed and who were on concomitant anticoagulant therapy between January 1, 2014 and December 31, 2015. The electronic medical record was evaluated for each presentation, diagnosis and subsequent treatment or management. Treatments utilized, relevant laboratory parameters and outcomes were recorded. **Results/Conclusions:** Results and conclusions are pending and will be presented at the Great Lakes Pharmacy Resident Conference

Learning Objectives:

List agents that are currently available for anticoagulation reversal

Discuss the advantages and disadvantages of the agents that can be used for anticoagulant reversal

Self Assessment Questions:

Which of the following agents decreases the anticoagulant effects of warfarin?

- A Phytonadione
- B: Idarucizumab
- C: Four factor prothrombin complex concentrate (PCC)
- D: A and C

Which of the following is a limitation of fresh frozen plasma (FFP) for emergency anticoagulation reversal?

- A Administration of small volumes of fluid relative to four factor prothrombin complex concentrate
- B Fresh frozen plasma (FFP) administration may result in anaphylaxis
- C Complete and immediate reversal of international normalized ratio
- D Fresh frozen plasma (FFP) can NOT be used in combination with

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-546L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

MEDICATION ADMINISTRATION THROUGH ENTERAL FEEDING TUBES: A QUALITY IMPROVEMENT PROJECT

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Purpose: Enteral feeding tubes (FTs) can be used to deliver not only nutrition but also medications to a patient. There are considerable challenges in optimizing medication therapy through FTs, which are further compounded by inappropriate medication administration practices. In 2016, the American Society for Parenteral and Enteral Nutrition (ASPEN) released updated recommendations for safe practices in enteral nutrition. In this update, the suggested procedure for administering medications through FTs was largely unchanged. Observational studies and nursing surveys have found that actual practice can significantly deviate from these recommendations. The objective of this project is to identify medication administration practices at this institution that are not consistent with ASPEN recommendations and to develop targeted interventions to correct these practices. **Methods:** Initial data collection occurred in October 2016 and consisted of observations of medication administration and surveying of nurses and pharmacists caring for adult inpatients. An automated Meditech nutrition report of patients on tube feedings was used to identify patients receiving medications through their FTs. Collected data was reviewed to identify practices that were not consistent with ASPEN recommendations. Various interventions to address identified needs are in progress, including Policy & Procedure updates, staff education, and health information system updates. A post implementation study planned for March 2016 will assess the impact of these interventions and identify additional needs for future quality improvement efforts. **Preliminary results:** 89% of nurses observed mixed medications, compared to 70% of nurses surveyed. Flush volumes before and after medication administration ranged from 20-120 mL during observations and 5-300 mL from survey responses. While 72% of nurses correctly identified phenytoin as a medication requiring extended holds of tube feedings, <10% were able to identify other common medications with similar administration requirements.

Conclusions: Conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify challenges in medication management for patients with FTs
Identify medications requiring tube feedings to be held for extended periods before and after administration

Self Assessment Questions:

Challenges in medication management for patients with FTs may include all of the following except:

- A: Limited studies on drug-formula interactions
- B: Alterations in drug pharmacokinetics due to dosage form modification
- C: Delivery of drug to sites in the GI tract other than the stomach
- D: Suitability of all medications and dosage forms for FT administration

Which of the following medications does not require enteral feeding to be held for an extended period of time before and after medication administration?

- A: Levofloxacin
- B: Pantoprazole suspension
- C: Phenytoin
- D: Warfarin

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-875L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EFFECT OF A BEDSIDE MEDICATION DELIVERY SERVICE ON 30-DAY READMISSION RATES IN A DISPROPORTIONATE SHARE HOSPITAL

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Purpose: With the full implementation of the Hospital Readmissions Reductions Program by Center for Medicare and Medicaid Services, healthcare institutions across the country have begun implementing programs aimed at reducing 30-day readmission rates. Disproportionate share hospitals (DSH) face unique challenges in obtaining access to resources for their uninsured and underinsured patient populations. The goal of this study is to determine the impact of a bedside medication delivery service on 30-day readmission rates and patient satisfaction at a DSH. **Methods:** The bedside medication delivery service will be provided through an in-house outpatient pharmacy. The inclusion criteria consists of: age 18 years or older, admitted from home and discharged to home, discharged from a hospital unit participating in the study, discharged during business hours of Franciscan Outpatient Pharmacy (FOP), English or Spanish speaking, and has insurance accepted by FOP. Data collection will include: age, gender, comorbidities, reason for admission, admission date, discharge date, discharge unit, number of new prescriptions upon discharge, if there is readmission with 30 days or discharge, and the reason for readmission. Patient satisfaction will be measured with an anonymous survey included with the filled prescriptions. The primary endpoints for this study are comparisons of all cause 30-day readmission between the study and non-participant groups, and patient satisfaction with bedside delivery service based on survey feedback. Secondary endpoints for this study include percent of eligible patients enrolled in the program, reasons for declining enrollment, reasons for readmission in both study and non-participant groups, and number of prescriptions filled by participating patients. **Results and Conclusions:** Data collection is still in progress, results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the challenges/barriers for patients that may lead to increased 30-day readmission rates.

Describe the possible impact of a bedside medication delivery service on 30-day readmission rates.

Self Assessment Questions:

What are the challenges/barriers for patients that may lead to increased 30-day readmission rates?

- A: Limited access to healthcare facilities
- B: Lack of healthcare insurance coverage
- C: Lack of transportation
- D: All of the above

Which of the following is true regarding the effect of bedside medication delivery service on 30 day readmission rates?

- A: A bedside medication delivery service could decrease 30-day readmission rates
- B: A bedside medication delivery service is difficult to integrate into discharge planning
- C: Disease severity could never have an impact on 30-day readmission rates
- D: Patients could always get their medications after discharge regardless of the time of day

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-835L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

CEFTRIAXONE VERSUS LEVOFLOXACIN FOR THE EMPIRIC TREATMENT OF ESCHERICHIA COLI URINARY TRACT INFECTION: IN THE SETTING OF HIGH FLUOROQUINOLONE RESISTANCE

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Urinary tract infections (UTIs) are among the most common bacterial infections, most commonly caused by Escherichia coli. Per the Infectious Disease Society of America guidelines, options for the initial treatment of pyelonephritis requiring hospitalization include intravenous (IV) levofloxacin or extended-spectrum cephalosporins. Globally, uropathogenic E. coli resistance rates to fluoroquinolones have increased over 10-fold in the past twenty years. In 2015, 38% of uropathogenic E. coli at this institution were levofloxacin-resistant and 10% were ceftriaxone-resistant. The purpose of this study is to compare the clinical outcomes of patients that received ceftriaxone to those who received IV levofloxacin empirically for the treatment of E. coli UTIs in the setting of high fluoroquinolone resistance. This is a retrospective, single center, cohort study of adults at a 433 bed community hospital with a urine culture positive for E. coli between January 1, 2015 and December 31, 2015 who received either IV levofloxacin or ceftriaxone empirically for the treatment of a UTI. Patients will be divided into two groups based upon the first dose antibiotic. Exclusion criteria encompass patients with polymicrobial UTIs, patients who received both agents empirically prior to the availability of susceptibility results, concomitant infection that occurred outside of the urinary tract, renal transplant recipients, and patients with suspected or confirmed prostatitis. The primary outcome is hospital length of stay. Baseline demographics, susceptibilities, time to appropriate antibiotic therapy, comorbidities, in-hospital mortality, ICU length of stay, 30-day readmission, total hospital cost, time to switch to PO agent, and susceptibility to empiric therapy will be collected through a review of electronic medical records. Continuous variables will be compared using a two-sample t-test or Mann-Whitney U test for normal and non-normal distributions, respectively. Categorical variables will be compared using the Chi-squared or Fishers exact test. P-values less than 0.05 will be considered statistically significant.

Learning Objectives:

Identify the conditions for which the FDA stated that the risks of using fluoroquinolones for antimicrobial treatment would outweigh the benefits
Name the most common gram negative bacteria associated with adult urinary tract infections

Self Assessment Questions:

FDA released a statement in May 2016 advising that the serious side effects associated with fluoroquinolones generally outweigh the benefits for the treatment of which of the following conditions?

- A sinusitis, pneumonia, and cellulitis
- B: sinusitis, osteomyelitis, and cellulitis
- C: sinusitis, endocarditis, and complicated urinary tract infections
- D: sinusitis, bronchitis, and uncomplicated urinary tract infections

Which gram negative bacteria is most commonly associated with adult urinary tract infections

- A Klebsiella pneumoniae
- B Enterococcus faecalis
- C Escherichia coli
- D Serratia marcescens

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-339L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EARLY DETECTION OF INFECTION THROUGH THE USE OF C-REACTIVE PROTEIN MONITORING PRIOR TO FEBRILE NEUTROPENIA DIAGNOSIS IN HEMATOPOIETIC CELL TRANSPLANTATION AND ACUTE LEUKEMIA PATIENTS

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Purpose: C-reactive protein (CRP) and procalcitonin (PCT) are inflammatory biomarkers that may be monitored in patients with suspected febrile neutropenia (FN) as the majority of these patients do not have an identifiable symptom or source of infection other than fever. In patients with FN, the National Comprehensive Cancer Network guideline does not include PCT or CRP and Infectious Diseases Society of America recommends against using PCT or CRP for FN workup due to insufficient evidence. Daily CRP monitoring is a standard practice used by the Hematology/Bone Marrow Transplant service at the University of Cincinnati Medical Center for patients receiving hematopoietic cell transplantation (HCT) preparative chemotherapy or induction chemotherapy for acute leukemia. The primary objective of this study is to evaluate the utility of CRP monitoring as an indicator of microbiologically documented infections or Clostridium difficile (C. diff) positive antigen test prior to first documented fever in patients with FN diagnosis. Methods: This retrospective, single center, cohort study included adult patients 18 years of age and older who underwent allogeneic or autologous HCT or received induction chemotherapy for the acute leukemia and who had daily CRP monitoring from January 2013 to August 2016. Patients receiving IV antibiotic therapy prior to HCT preparative or induction chemotherapy were excluded as well as prisoners and pregnant women. Major complications (MCs) are defined as hepatic veno-occlusive disease, grade II or higher acute graft versus host disease, severe mucositis, transfer to an intensive care unit, and death. Primary outcome included overall mean CRP value and mean CRP value three days prior to FN diagnosis in patients with microbiologically documented or C. diff positive infections. Secondary outcomes included mean CRP value three days prior to MCs or five days prior to engraftment and mean CRP value prior to neutropenia.

Results: Data analysis are currently ongoing.

Learning Objectives:

Identify chemotherapy regimens that increase risk for severe prolonged neutropenia

Review national guidelines for the diagnosis and management of febrile neutropenia

Self Assessment Questions:

What conditioning and induction chemotherapy regimens are associated with severe prolonged neutropenia?

- A Melphalan for autologous HCT
- B: 7 + 3 (cytarabine x 7 days + idarubicin x 3 days)
- C: Flag-ida
- D: All of the above

What parameters are recommended by both NCCN and IDSA guideline: in the initial workup for febrile neutropenia?

- A CBC with differential, CMP, CRP, and PCT
- B CBC with differential, CMP, and 2 sets of blood cultures
- C CBC with differential, CMP, CRP, PCT, and 2 sets of blood culture
- D None of the above

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-308L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EFFICACY AND SAFETY OF DILTIAZEM FOR SUPRAVENTRICULAR TACHYCARDIA IN THE EMERGENCY DEPARTMENT

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Purpose: Supraventricular tachycardia (SVT) is an arrhythmia usually resulting in patients presenting to the emergency department (ED). In addition to vagal maneuvers and adenosine, calcium channel blockers have been studied as an effective treatment option that avoids the adverse effects experienced after adenosine administration. The objective of this study is to compare pre- and post-diltiazem protocol implementation outcomes of patients in the ED with SVT, specifically treatment efficacy. Secondary outcomes include duration of diltiazem treatment post-conversion and if a weight-based relationship exists regarding efficacious diltiazem dosing. **Methods:** This single center, retrospective cohort study will include adults 18 years of age or older presenting to the ED with SVT from July 1, 2015 to June 30, 2017 to capture patients prior to and after protocol implementation on May 2, 2016. Patients are grouped into a pre-protocol adenosine-only group who received treatment as directed by the prescriber and a post-protocol implementation group who, after treatment failure with vagal maneuvers +/- adenosine, received intravenous diltiazem therapy. **Preliminary Results:** Of the 18 pre-protocol patients reviewed, nine met inclusion criteria. Of four post-protocol patients to date, two met inclusion criteria and two have been excluded for an arrhythmia other than SVT. There are no statistically significant differences in demographics or cumulative adenosine doses administered between groups. Seventy-eight percent of pre-protocol patients successfully converted to normal sinus rhythm (NSR) after treatment with adenosine and 100% of post-protocol patients successfully converted to NSR ($p=1.00$, 95% CI -0.49, 0.05) after treatment with diltiazem. Of the post-protocol patients, the mean (SD) dose of diltiazem administered was 33.8 (22.9) mg, or 0.43 (0.21) mg/kg. No adverse effects (e.g. chest pain with adenosine or hypotension with diltiazem) have been reported in either group. **Conclusion:** Final results and conclusion will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

List potential adverse effects of pharmacologic treatment options for hemodynamically stable patients with supraventricular tachycardia
Discuss gaps in the literature regarding the use of diltiazem for hemodynamically stable patients with supraventricular tachycardia

Self Assessment Questions:

Which of the following is a potential adverse effect of intravenous diltiazem when utilized for treatment of supraventricular tachycardia?

- A: Cardiac pause
- B: Chest pressure
- C: Hyperventilation
- D: Hypotension

Which of the following is well-described in the literature regarding the use of diltiazem for hemodynamically stable patients with supraventricular tachycardia?

- A: Efficacy of therapy evidenced by conversion to normal sinus rhythm
- B: Optimal duration of therapy after conversion to normal sinus rhythm
- C: Weight-based relationship of total required diltiazem dose
- D: Patient satisfaction scores with diltiazem compared to adenosine

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-551L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

THE ROLE OF AN AMBULATORY CARE PHARMACIST IN AN OUTPATIENT CARDIOLOGY CLINIC: FOCUS ON HIGH RISK MEDICATION MANAGEMENT

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Purpose: Atrial fibrillation (AF) is the most common sustained arrhythmia worldwide and is associated with increased mortality. Patients with AF are at increased risk for significant adverse drug events and medication errors due to polypharmacy and use of narrow therapeutic range medications. The objective of this study is to justify the cost of a clinical pharmacist to be involved in medication therapy management, drug monitoring and integration into the ambulatory cardiology decision-making process. This study will take place at Traverse Heart and Vascular outpatient cardiology clinic, a service partner of Munson Medical Center (MMC). This clinic serves 37,000 residents in northern Michigan across eleven practice locations. A monitoring protocol for antiarrhythmics and novel anticoagulants was developed from clinical guideline recommendations and adherence will be assessed based on retrospective chart review. Patients will be included based on prescription refill patterns while data to be collected includes agent used, electrocardiogram frequency, renal function, QTc trends, dose optimization and potential pharmacy interventions. Within Traverse Heart and Vascular a new arrhythmia clinic is being developed and will include a primary electrophysiologist, midlevel practitioner, clinical nurse specialist and pharmacist. This multidisciplinary team will see new referrals from primary care physicians and patients discharged from MMC. Additionally, a clinical pharmacist can take over the responsibility of medication education and thus free up physician time to increase number of patients seen and spend more time doing procedures in the electrophysiology lab. Expansion of clinical pharmacy services is often impeded by compensation barriers and provider status. This project is meant to identify ways to generate revenue and bill for clinical pharmacy services while delivering high-quality care under physician leadership.

Results: Initial results and conclusion will be presented at the 2016 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify the role of the pharmacist in a multidisciplinary high risk medication clinic.
Describe methods to bill for pharmacy services in an outpatient physician based clinic.

Self Assessment Questions:

Which of the following is a major barrier for pharmacists in the ambulatory setting?

- A: Billing and reimbursement
- B: Inadequate training
- C: Lack of provider status
- D: A and C

Which of the following codes can be used to bill for clinical pharmacy services in a physician based clinic?

- A: Chronic Care Management
- B: Incident-to physician
- C: Transitional Care Management
- D: All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-490L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION AND IMPLEMENTATION OF A DIABETIC KETOACIDOSIS PROTOCOL IN THE EMERGENCY DEPARTMENT

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Purpose: The purpose of this study is to evaluate adherence to standards of care in diabetic ketoacidosis (DKA) management in the emergency department (ED). **Background:** Diabetic ketoacidosis is a serious acute metabolic complication of diabetes and is commonly encountered in the ED. Treatment of DKA requires prompt correction of dehydration, hyperglycemia, and electrolyte imbalances. Coordination of frequent patient monitoring is a critical component of DKA management. Evidence-based protocols for the management of DKA are provided by the American Diabetes Association. **Methods:** This retrospective study evaluated patients diagnosed with DKA and treated with an insulin infusion in the SwedishAmerican Hospital ED between January 2016 and December 2016. Only initial administrations of insulin infusions were included. Diagnoses of nonketotic hyperosmolar hyperglycemia, and alcoholic ketoacidosis were excluded. Data reviewed included age, weight, point-of-care glucose, insulin bolus doses, insulin infusion rates, fluid administration, basic metabolic panel, venous pH, and medication administration records. Efficacy endpoints evaluated were the rate of change of glucose during insulin infusion and appropriateness of boluses in the setting of subtherapeutic glucose decline. Safety endpoints evaluated were insulin infusion doses, hypoglycemia, and appropriateness of laboratory monitoring. **Results/Conclusion:** The review consisting of 21 cases, found inconsistent insulin infusion doses and laboratory monitoring. The average initial weight-based infusion rate was 0.09 units/kg/hr and 19% of cases received a bolus. Blood sugar was checked within one hour of insulin infusion in 66.7% of cases, while electrolytes were checked within two hours of insulin infusion in 33.3% of cases. The average percent decrease of blood sugar in the first hour was 18%. Zero of the five cases in which the percent decrease in the first hour was less than 10% received a bolus. There were no cases of hypoglycemia. Based on this data, implementation of a standardized DKA order set in the ED is recommended.

Learning Objectives:

Relate American Diabetes Association consensus statement recommendations for the treatment of diabetic ketoacidosis to the Emergency Department.

Review adherence to standards of care in treating patients with diabetic ketoacidosis in the Emergency Department.

Self Assessment Questions:

Which of the following are potential complications with aggressive DKA treatment?

- A: Hyperkalemia
- B: Hyperglycemia
- C: Hyponatremia
- D: Hypokalemia

Which of the following statements about DKA is true?

- A: DKA emergency room visits have decreased over the last several years.
- B: Evidence-based protocols for the management of DKA are provided by the American Diabetes Association.
- C: DKA is a non-emergent, metabolic complication of diabetes.
- D: Acid-base status and electrolytes do not need to be monitored in the ED.

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-487L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ASSESSMENT AND STANDARDIZATION OF NICU PHARMACIST MONITORING PRACTICES

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Purpose: Aurora Health Care provides care to neonatal patients throughout eastern Wisconsin and northern Illinois, with 7 of its 15 hospitals equipped with neonatal intensive care units (NICU). Within the Aurora Health Care System, several different pharmacist staffing models exist, which often leads to a variation in the typical monitoring practices for NICU patients. Therefore, the potential to standardize practices and enhance departmental efficiency in the delivery of care while maintaining safety and quality exists. The objective of this project is to create and implement new standards of NICU pharmacist monitoring. **Methods:** A primary literature search was conducted to search for guidance related to clinical pharmacist activities in the NICU setting from national organizations. Then, site visits were conducted at three hospitals within Aurora Health Care that care for NICU patients. Information about the way pharmacists currently monitor NICU patients was gathered. This information was used to create a survey to assess specific monitoring activities, common interventions, and frequent documentation practices. Data were analyzed and activities with and without frequent intervention were identified. General survey results were shared with neonatologists. Neonatologist input was gathered about their opinion of value in specific pharmacist monitoring activities. Resources specific to each monitoring practice were created. **Results and Conclusions:** Results and Conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify two NICU pharmacist monitoring activities that were determined to be of high value.

Describe two resources created to aid pharmacists in NICU patient monitoring.

Self Assessment Questions:

Which of the following was identified as a NICU pharmacist monitoring activity that pharmacists should routinely start doing?

- A: Following Neonatal Abstinence Syndrome scoring
- B: Assessing adjustments for medications that have weight-based dosing
- C: Pharmacist-dosing antibiotics
- D: Following apnea scores

Which of the following topics were included in the resource?

- A: Intravenous to by mouth conversions
- B: Retinopathy of prematurity
- C: Hyperbilirubinemia
- D: Renal Function

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-730L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION OF FILMARRAY BLOOD CULTURE IDENTIFICATION PANEL: ASSESSMENT OF TIME TO APPROPRIATE ANTIMICROBIAL THERAPY AND SUBSEQUENT IMPACT ON PATIENT OUTCOMES

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Purpose: The purpose of this study is to analyze the effects of the FilmArray Blood Culture Identification (BCID) panel on appropriate antimicrobial use, including duration of vancomycin therapy, and patient outcomes. **Background:** Mount Carmel Health System recently implemented the BCID panel, which identifies 24 organisms and 3 antibiotic resistance genes in approximately 1 hour. The BCID panel is used on all positive blood cultures, in addition to traditional culture-based methods. **Methods:** This retrospective study included patients ≥ 18 years of age who had a positive blood culture for contaminants or methicillin-sensitive *Staphylococcus aureus* (MSSA). Contaminant was defined as coagulase-negative staphylococcus or *Viridans streptococcus* in one out of two cultures. Patients were excluded if they had a positive blood culture for pathogens other than contaminants or MSSA, received vancomycin for an indication other than sepsis or bacteremia, or if they expired, left against medical advice, or transferred to palliative care within 24 hours of the positive culture. **Charlson Comorbidity Index and Pitt Bacteremia score** were used to ensure similar baseline characteristics between groups. All outcomes were compared pre- and post- implementation of the BCID panel. Time to appropriate antimicrobial therapy and patient length of hospital stay were the primary outcomes of the study. Appropriate therapy was defined as no antibiotic administration or de-escalation from resistant gram positive coverage. Time was calculated as the difference between the stop time of vancomycin and the start time of appropriate antimicrobial therapy. If no administration of vancomycin occurred, time of pathogen identification was used. Secondary outcomes included length of vancomycin therapy measured in hours, length of intensive care unit stay, time to negative blood culture, adverse drug events, 30-day mortality, and total hospital cost. **Results and Conclusions:** To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the advantages of the blood culture identification panel when compared to traditional culture-based methods

Recognize the potential positive impact on patient care, if the results of the blood culture identification panel are utilized appropriately

Self Assessment Questions:

The BCID panel is able to: I. Identify a pathogen within one hour II. Identify three genes of resistance III. Determine pathogen susceptibility

- A I, ii
- B: ii, iii
- C: I, iii
- D: I, ii, iii

Utilizing the results of the BCID panel, could potentially:

- A Increase use of broad-spectrum antibiotics
- B Reduce time to appropriate antimicrobial therapy
- C Increase patient length of hospital stay
- D Negatively impact patient outcomes

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-505L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF PATIENTS OF A PHARMACIST-LED POST FALL MEDICATION REVIEW SERVICE DURING HOSPITALIZATION

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Purpose: Falls are associated with considerable morbidity, mortality, reduced functioning, and premature nursing home admissions. 1 The purpose of this retrospective chart review is to assess risk factors for patients at a high risk of falls, and also review the number of pharmacist accepted recommendations after the implementation of a post-fall e-consult. The current post-fall e-consult is generated by a nursing note after a patient falls in the hospital. After the consult is received by a pharmacist, the patients medications and laboratory values are reviewed, and the recommendations are communicated to the patients provider. **Method:** A retrospective chart review will be performed for any patients that have fallen during a hospitalization at the William S. Middleton Memorial Veterans Hospital where a pharmacy post fall e-consult was completed. The service began in September 2015. E-consults completed between September 2015 and February 2017 will be reviewed. The primary outcome will include the number of pharmacists recommendations accepted by the patients provider during a hospitalization. Secondary outcomes will include baseline characteristics, including Morse scale, number of medications on admission, anticholinergic score, reason for admission, co-morbidities, and history of falls. Paired categorical variables will be analyzed using the McNemar test. Unpaired categorical variables will be analyzed using Chi Square or Fishers exact tests. **Results/Conclusion:** pending

Conflict of interest: The speaker has no actual or potential conflict of interest in relation to the presentation. **Reference:** 1) Guideline for the Prevention of Falls in Older Persons. Journal of the American Geriatrics Society. 49: 5 (664-672). 2001.

Learning Objectives:

Review risk factors for falls

Identify the importance of pharmacy involvement for prevention of falls in the hospital setting

Self Assessment Questions:

Which of the following is a risk factor for falls for hospitalized patients?

- A Age < 65 years
- B: History of confusion or dementia
- C: A small number of medications on admission
- D: Good lighting

2. A 75 y/o male is admitted for surgery and subsequently has a fall during his hospitalization. Which of the following medications are unlikely to increase his risk of falls?

- A Oxycodone 5 mg Q4H PRN
- B Losartan 100 mg daily
- C Clonazepam 0.25 mg BID PRN
- D Cyanocobalamin 1000mcg daily

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-623L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF PERIOPERATIVE ANTICOAGULATION BRIDGING PRACTICE IN VETERANS ON WARFARIN THERAPY AT EDWARD HINES, JR. VA HOSPITAL

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PURPOSE: Perioperative bridging of warfarin therapy has become a subject of growing interest as more literature has been published. Several guidelines on perioperative management of anticoagulant therapy have been released, including the American Association of Chest Physicians and the American College of Cardiology/American Heart Association. Recent clinical trials suggest a shift in how patients on warfarin therapy should be managed perioperatively. These trials propose a net clinical harm with an increased incidence of hemorrhage versus benefit in thrombotic risk reduction in a majority of patients being perioperatively bridged. Given the ambiguity of recommendations regarding perioperative management and pending the anticipated release of a formal VA guidance document on this subject, a retrospective Quality Assurance project was conducted with the purpose of better depicting the current practice of perioperative bridging in veterans on warfarin therapy at the Edward Hines, Jr. VA Hospital.

METHODS: This study was a retrospective, observational chart review evaluating a cohort of 150 veterans from August 2014 to August 2016. Patients meeting criteria were assessed from time of warfarin therapy interruption to 30 days postoperatively. Data was collected through review of the veteran's electronic health record. Data collection points broadly included evaluation of a veteran's past medical history, concomitant medication use, stratification of a patient's risk for thrombotic or hemorrhagic event, confirmation of net clinical outcomes and objective data. Patients were included if they were 18 years or older indicated for warfarin therapy with one of the following indications: atrial fibrillation/flutter, mechanical valve replacement or history of venous thromboembolism and prescribed enoxaparin. Exclusion criteria included patients with insufficient data available in a veteran's chart, patients who underwent a non-elective, emergency invasive procedure, prescribing of a novel oral anticoagulant and/or administration of enoxaparin indicated for long-term use. **RESULTS/CONCLUSIONS:** Results and conclusions to be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the current perioperative bridging practice and clinical outcomes of a veteran population at the Edward Hines, Jr. VA Hospital.

Recognize risk factors to consider when evaluating a patient for perioperative bridging with a low molecular weight heparin.

Self Assessment Questions:

CW is a 76-year-old WM with nonvalvular atrial fibrillation being contacted via phone from the Hines VA anticoagulation clinic for routine follow-up of warfarin management. His past medical history is

- A: Continue warfarin without perioperative bridging
- B: Hold warfarin only
- C: Hold warfarin + initiate therapeutic enoxaparin
- D: Hold warfarin + initiate prophylaxis enoxaparin

Which of the following are clinical considerations to perioperative bridging per clinical guidelines (CHEST & ACC)?

- A: Pulmonary Function
- B: Thromboembolic Risk
- C: Risk of Perioperative Bleeding
- D: B+c

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-300L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

THE USE OF INHALED NITRIC OXIDE VERSUS INHALED EPOPROSTENOL IN HIGH RISK LUNG TRANSPLANT RECIPIENTS

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Statement of the Purpose: A potential complication following lung transplantation is primary graft dysfunction (PGD). Primary graft dysfunction occurs within the first 72 hours following transplant and is a severe form of ischemia reperfusion acute lung injury. Primary graft dysfunction is associated with both pulmonary hypertension and hypoxemia requiring treatment with supportive therapy. Not only does PGD complicate the post-operative course, but it is also a known predictor of both early and late mortality. Strategies used to manage PGD include pulmonary arterial vasodilators such as inhaled nitric oxide (iNO), causing vascular smooth muscle relaxation with the hope of improved oxygenation. An alternative pulmonary vasodilator, which has not been well studied in this population, is inhaled epoprostenol. The objective of this study is to evaluate PGD scores in high-risk lung transplant recipients who receive inhaled epoprostenol versus iNO.

Statement of the Methods Used: This is a retrospective, single centered, cohort study of high risk lung transplant patients who received either inhaled nitric oxide or inhaled epoprostenol within the post-operative period at Loyola University Medical Center. Patients will be identified for inclusion based on whether they received both a lung transplant during the current hospitalization and an inhaled vasodilator immediately post-operatively in order to assess PGD within 72 hours.

Summary of Results to Support Conclusions: Pending
Conclusions Reached: Pending

Learning Objectives:

Discuss the definition of primary graft dysfunction and its implications or outcomes in lung transplantation

Describe the role of inhaled vasodilators in the management of primary graft dysfunction following lung transplantation

Self Assessment Questions:

Primary graft dysfunction is present when:

- A: Radiographic infiltrates are present on chest X-ray
- B: Bronchiolitis obliterans syndrome occurs
- C: The PaO₂/FiO₂ ratio is reduced
- D: A and C

Inhaled pulmonary vasodilators have been used in the management of primary graft dysfunction to potentially improve:

- A: Hypercapnia
- B: Hypoxemia
- C: Pulmonary Hypertension
- D: B and C

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-327L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

THE EFFICACY OF MONTELUKAST IN ASTHMA, COPD, AND COMBINED COPD/ASTHMA

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Purpose: Asthma and COPD are widely prevalent lung diseases affecting millions of people and are significant causes of mortality and economic burden in the United States. Patients with asthma and COPD commonly experience exacerbations resulting in emergency room and acute care visits, as well hospitalizations. Clinical guidelines for the treatment of asthma support the use of montelukast as an alternative medication in patients with moderate asthma as it has shown to have some benefit in reducing resource utilization. However, there is a lack of outcomes data regarding the use of montelukast in veteran patients with asthma at the JBVAMC. Additionally, there is minimal data regarding the use of montelukast in the treatment of COPD and combined asthma/COPD. The purpose of this study is to evaluate the benefit of montelukast in reducing exacerbations and utilization of resources in veteran patients with asthma, COPD, and combined asthma/COPD. **Methods:** The study will be a retrospective, electronic chart review of patients who were newly initiated on montelukast between January 1, 2004 and September 30, 2014. Subjects who received a prescription for montelukast during the study period will be identified from a report generated from the electronic medical record. The primary endpoints will be the change in number of total ED/Urgent Care/Acute Care visits due to exacerbations and the change in number of total hospitalizations due to exacerbations before and after montelukast initiation. The secondary endpoints will be the change in number of oral steroid prescriptions issued, the percentage of patients who required intensification of their pulmonary regimen, change in FEV1, and documentation of death during study period.

Results/Conclusions: Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Define the mechanism of action of montelukast

Describe the current place in therapy of montelukast in the treatment of COPD

Self Assessment Questions:

The mechanism of action of montelukast can best be described as:

- A Long-acting muscarinic antagonist
- B: Leukotriene receptor antagonist
- C: Binds to and inhibits IgE receptor on mast cells and basophils
- D: Phosphodiesterase-4 inhibitor

Current guidelines for the management of COPD recommend montelukast as:

- A A first-line agent for patients in Group C and D in combination with
- B A second-line agent for patients in Groups B, C, and D
- C An alternative agent for Group D patients with FEV1 < 50% predic
- D Montelukast is not supported by current COPD guidelines. Howev

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-548L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION OF CONTINUOUS MONITORING FOR PATIENTS RECEIVING PATIENT CONTROLLED ANALGESIA

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Purpose: The rate of respiratory depression in patients receiving patient controlled analgesia (PCA) is estimated to be about 0.2 to 5%. A review of an anesthesia claims database found 93% of opioid-induced respiratory depression events were preventable, with half of all events occurring within two hours since last nursing assessment. Respiratory depression can lead to intensive care unit (ICU) transfer, increased length of stay, irreversible severe brain damage, and death. Patients at risk include patients with chronic obstructive pulmonary disease (COPD), sleep apnea, obesity, and use of concomitant sedating medications. Several national organizations recommend use of continuous monitoring for patients receiving opioid therapy. The objective of this project is to implement continuous electronic monitoring in patients receiving patient controlled analgesia. **Methods:** A literature search and internal data review was conducted to develop a recommendation on how to more effectively monitor patients on PCA. An interdisciplinary team was assembled to develop revisions to the PCA order set, which included continuous pulse oximetry for all patients on PCA and continuous capnography monitoring for all patients with a PCA basal rate or on supplemental oxygen. These revisions were vetted through appropriate stakeholder groups such as medication safety, system nursing practice council, and medical service line representatives such as orthopedics, general surgery, and anesthesia to garner approval. Facilitation of education and implementation was coordinated with the help of nursing leaders. Post-implementation data collection will be conducted to assess the impact of continuous monitoring. **Summary of preliminary results/Conclusions:** Data collection and analysis is ongoing. Results and conclusions will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the role of capnography monitoring for patients who are receiving supplemental oxygen.

Describe current recommendations for continuous monitoring of patients on PCA.

Self Assessment Questions:

Which of the following is correct for patients receiving supplemental oxygen while receiving patient controlled analgesia?

- A Patients using supplemental oxygen do not need routine monitoring
- B: Capnography monitoring is a better predictor for respiratory depression
- C: While on supplemental oxygen, pulse oximetry is very accurate.
- D: Patients on supplemental oxygen should not use PCA.

Which of the following is correct about current recommendations regarding continuous monitoring for patients on PCA?

- A Recommendations are conflicting on the appropriate way to monitor
- B Recommendations are in consensus on which modality is best to
- C There is more than enough evidence to create recommendations for
- D There are no recommendations or guidelines.

Q1 Answer: B Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-937L05-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTING AND EVALUATING TELEPHARMACY SERVICES IN THE COMMUNITY SETTING

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Purpose: The purpose of this project is to implement software that allows for remote prescription verification and patient counseling within a community pharmacy and to evaluate the impact this model creates on pharmacist time. **Methods:** Pharmacies were identified to serve as remote dispense site (RDS) and supervising pharmacy by evaluating prescription volume, adjusted workload, and staffing structure. Adaptability of the current staff and unique site confounders based on the clinic characteristics were also considered in determining the appropriate RDS. Required licensure from the state board of pharmacy and the DEA for the new RDS were obtained, and notification was sent to the National Provider Identifier registry and National Council for Prescription Drug Programs. To be in compliance with state law we modified all other labeling and signage to reflect the new designation of RDS. Policies and procedures outlining operations were updated and responsibilities between sites were delineated. Throughout this process, we coordinated with our telepharmacy vendor to ensure the proper equipment would be available for implementation and appropriate support would be provided on our go-live date. Communication of concept was done in person to all impacted pharmacists, technicians, clinic staff. A computer-based training outlining new dispensing workflows was created and completed by pharmacy staff members. Additionally, time was scheduled for primary staff to train at an already established RDS and supervising pharmacy location. Following implementation, pharmacists at the RDS manually recorded when they were needed within the prescription dispensing workflow to allow for understanding of the new pharmacist role. Reports comparing pharmacist time in prescription dispensing queues were also created to compare pharmacist time spent in the dispensing workflow prior to and following implementation. **Results & Conclusions:** To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

State the necessary steps that must be considered when transitioning a pharmacy to a remote dispensing site from a legal, fiscal, employee scheduling, and patient satisfaction perspective

Describe the benefits of utilizing telepharmacy services in the community setting

Self Assessment Questions:

Which of the following must be changed when transitioning a pharmacy to a remote dispensing site:

- A: DEA registration
- B: Pharmacy licensure
- C: Pharmacy signage
- D: All of the above

Which of the following can only be completed at a remote dispensing site with a pharmacist?

- A: Administration of immunizations
- B: Blood pressure screening
- C: Dispensing of controlled substances
- D: All of the above

Q1 Answer: D Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-744L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

TRIPLE THREAT: ANALYSIS OF OPIOID, BENZODIAZEPINE, AND MUSCLE RELAXANT DISCONTINUATION AFTER PHARMACY BENEFIT MANAGER INTERVENTION TO PRESCRIBERS

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PURPOSE: To determine the impact of prescriber mailings on the discontinuation of opioids, benzodiazepines/hypnotics, and skeletal muscle relaxants among members who are prescribed these agents simultaneously. Concomitant use of these medications has potential for abuse and risk for overdose. It is difficult to tell from a pharmacy benefits manager perspective whether members are using these medications legitimately, diverting them, or abusing them. **METHODS:** A retrospective analysis was conducted using Navitus Retrospective Drug Utilization Review (RDUR) application. Members who had at least one claim for an opioid, a benzodiazepine/hypnotic, and a skeletal muscle relaxant from April to July 2016 were included. In August, letters were mailed to members prescribers requesting a medication review, prescriber coordination of care, and discontinuation of unnecessary agents. In December 2016, RDUR outcomes measured the number of members who had claims for two or fewer medication classes, no longer requalifying for the program during the timeframe of August to November. Unsuccessful members had at least one claim for all three medication classes during this timeframe. **RESULTS:** Of 192 members included, 84 (43.8%) successfully had at least one medication class discontinued after the intervention mailings. Approximately 75% of the patients identified were female; however, the success rate among males and females was similar (42.6% vs 44.1%). The mean number of claims in the successful group decreased from 10.0 to 6.1, while the number of claims in the unsuccessful group remained the same. Cyclobenzaprine, hydrocodone/acetaminophen, and oxycodone were the most commonly discontinued medications and accounted for over 25% of discontinuations. **CONCLUSION:** Approximately 44% of members who were initially identified for the Triple Threat program no longer requalified after the prescriber intervention. Both men and women had similar success rates. This clinically significant success rate warrants further research and expansion of the Triple Threat program.

Learning Objectives:

List the three classes of medications that comprise the Triple Threat program

Discuss the reasoning for stricter monitoring of the use of these medications concomitantly

Self Assessment Questions:

The Triple Threat program is best described by this type of intervention:

- A: Concurrent drug utilization review (CDUR)
- B: Retrospective drug utilization review (RDUR)
- C: Prospective drug utilization review (PDUR)
- D: Gap in therapy (GIT)

Which gender had better overall success rates with the Triple Threat program?

- A: Men
- B: Women
- C: Both genders had similar success rates
- D: Neither gender was successful

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-925L05-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

COMPARISON OF TOTAL CUMULATIVE DOSE OF INTRANASAL VERSUS INTRAVENOUS NALOXONE IN PATIENTS WITH OPIOID OVERDOSE

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The United States is facing a major health crisis involving an epidemic of deaths from drug overdose. Naloxone hydrochloride is a short-acting opioid antagonist used to reverse opioid overdose. There is a perception that the administration of naloxone intranasally leads to an increase in total amount of naloxone required in patients with opioid overdose when compared to intravenous (IV) administration. Previous literature found prehospital intranasal naloxone administered by emergency medical services (EMS) was associated with increased subsequent naloxone doses and longer time to clinical response when compared to IV administration. A comparison of total cumulative dose of intranasal naloxone versus IV has yet to be evaluated in patients treated in the emergency department (ED). We hypothesize that patients who initially received intranasal naloxone for opioid overdose required a greater cumulative dose to elicit a clinical response compared to patients who initially received IV naloxone. The primary objective of this single center, retrospective cohort study is to determine if patients presenting to the ED who received intranasal naloxone for initial resuscitation required a greater cumulative dose to elicit a clinical response compared to patients who initially received IV naloxone. The primary outcome will be expressed as the average total cumulative naloxone dose required to elicit a clinical response in each group. The secondary objectives of this study are to determine if the initial administration of intranasal naloxone correlated with worse patient outcomes when compared to IV administration and to identify predictors of increased cumulative dose requirements. All patients who received at least one dose of intranasal or IV naloxone administered by first responders or ED personnel at Cleveland Clinic Akron General for opioid overdose between January 1, 2014 and December 31, 2016 were included in the study. Final results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the indication for naloxone in opioid overdose
Review the pharmacology of naloxone

Self Assessment Questions:

Naloxone is indicated for the complete or partial reversal of:

- A: Opioids
- B: Benzodiazepines
- C: Cocaine
- D: Barbiturates

What is the mechanism of action of naloxone?

- A: Partial mu agonist that competes and displaces opioids at opioid r
- B: Potentiates NMDA receptors
- C: Competitively inhibits activity at the GABA receptor complex
- D: Pure opioid antagonist that competes and displaces opioids at opi

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-645L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF PAIN MANAGEMENT OUTCOMES IN A SECONDARY LEVEL INTERDISCIPLINARY PAIN CLINIC

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Purpose: The Physical Medicine and Rehabilitation Service (PMRS) Pain Clinic within the Richard L. Roudebush Veteran Affairs Medical Center (VAMC) offers secondary and tertiary level interdisciplinary care for veterans with chronic non-cancer pain. The secondary level clinic offers a variety of interventions with the goal of minimizing opioid use and improving pain control. Outcomes data for this clinic is collected via the Pain Outcomes Questionnaire-Short Form (POQ-SF), a validated pain scale designed to score multidimensional pain interventions. The objective of this study is to assess the outcomes of patients enrolled in the secondary level of the PMRS Pain Clinic at the Richard L. Roudebush VAMC. **Methods:** Data collection and analysis will be completed via a retrospective chart review in the Computerized Patient Record System (CPRS) for patients enrolled and discharged from the secondary level clinic between August 1, 2016 and March 1, 2017. Additional inclusion criteria will include age greater than or equal to 18 years old, diagnosis of chronic non-cancer pain, and opioid use upon admission to the program. Patients lost to follow up will be excluded. Data collected will include baseline characteristics, adjunctive non-opioid pharmacologic treatment, morphine equivalent daily dose (MEDD), POQ-SF total and individual domain scores, length of clinic enrollment, and specific clinic interventions. **Preliminary Results:** Fifty-seven patients identified for inclusion in the study to date. Six of these patients have completed the POQ-SF at both admission and discharge. A variety of interventions were made in attempt to decrease MEDD and POQ-SF scores. Additional results will be presented at the Great Lakes Pharmacy Residency Conference. **Conclusion:** Conclusions to be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify the role of opioids in the treatment of chronic non-cancer pain
Describe the utility of the Pain Outcomes Questionnaire-Short Form (POQ-SF) in the chronic non-cancer pain management of veterans

Self Assessment Questions:

What is a recommended first-line treatment for chronic non-cancer pain?

- A: Acetaminophen
- B: Escitalopram
- C: Hydrocodone
- D: Fentanyl

The Pain Outcomes Questionnaire-Short Form (POQ-SF) is used in directly determining which of the following?

- A: Starting opioid dose
- B: Score of multidimensional pain interventions
- C: Targeted non-pharmacologic interventions
- D: Patient satisfaction

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-692L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

RETROSPECTIVE ANALYSIS OF ANTIMICROBIAL SELECTION AND TIMING FOR TREATMENT OF FEBRILE NEUTROPENIA.

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Purpose: This study was designed to assess adherence to Infectious Diseases Society of America (IDSA) febrile neutropenia treatment guideline recommendations regarding appropriate selection and timing of antimicrobial agents. Additionally, potential risk factors for non-adherence to guideline-based recommendations were analyzed. **Methods:** The electronic medical record system identified patients meeting inclusion criteria: diagnoses of cancer and febrile neutropenia with or without a documented temperature greater than or equal to 38 degrees Celsius (100.4 degrees Fahrenheit). Each patients demographic, admission, and antimicrobial treatment data was collected. All treatment courses were analyzed for proper selection and timely administration of antimicrobial agents. Treatment courses were subsequently categorized as "adherent" or "non-adherent" based on IDSA treatment guideline. Treatment data was further analyzed to determine any risk factors potentially leading to non-adherent treatment courses. **Results:** Descriptive statistics and Pearson Chi-Square test were used in data analysis. Sixty-seven patient records met inclusion criteria. Forty-three (64%) treatment courses were non-adherent to the specified guideline. Inappropriate addition of empiric vancomycin was the most common reason for non-adherence (49%). Utilization of "stat" order priority was significantly higher in the adherent treatment course group ($p=0.01$). **Conclusion:** The majority of febrile neutropenia treatment courses were non-adherent to guideline recommendations and inappropriate empiric vancomycin was the most common reason for non-adherence. Education should be provided to physicians regarding appropriate use of vancomycin in this population. Providers should be educated to utilize the "stat" ordering feature as this was associated with more adherent treatment courses.

Learning Objectives:

Define appropriate timing of antimicrobial agents for treatment of febrile neutropenia

Recall appropriate indications for initiating empiric vancomycin for treatment of febrile neutropenia

Self Assessment Questions:

Antimicrobial agents should be administered within:

- A: 30 minutes
- B: 1 hour
- C: 2 hours
- D: 6 hours

Addition of empiric vancomycin is appropriate for treatment of febrile neutropenia in which of the following scenarios?

- A: Patient is <65 years old
- B: Patient presents with hypotension and pneumonia is suspected
- C: The patient endorses a diagnosis of HIV/AIDS in addition to cancer
- D: Patient ANC is <500 cells/mm³ and temperature is 102.1 degrees

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-647L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

OPTIMIZING A PHARMACY DASHBOARD TO IMPROVE SUCCESS AT IMPLEMENTATION

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Purpose: Measures of pharmacist productivity are often desired to validate the role of pharmacists and support expansion of pharmacy services. Benchmarking systems are ideally used to continuously evaluate and implement best practices within pharmacy departments and must be designed in ways that accurately and effectively reflect the work completed. Often, external benchmarking systems are not flexible enough to account for variability in pharmacy clinical services provided or the ever-expanding role of pharmacists in their specific workplace. While pharmacist productivity is commonly measured using markers of quantity rather than markers of quality, clinical activities must be accounted for to better measure true pharmacist productivity. An internally developed pharmacy dashboard has been created to capture pharmacist productivity data for Norton Healthcare. The goals of the dashboard are to serve as an internal benchmarking system for up-to-date analysis of pharmacist productivity, to better identify opportunities for improvement, and to drive clinical workflow. The purpose of this process improvement project is to optimize the dashboard tool before widespread implementation. **Methods:** This project focuses on validation of pharmacist productivity data, improvement of the qualitative productivity measurement, and assessment of the effect of education or pharmacist productivity. This strategy aims to create a continuous quality improvement process that incorporates pharmacist feedback with an emphasis on clinical productivity. Ultimately, the goal is to utilize the dashboard tool for benchmarking at both hospital and health-system levels. **Results and Conclusions:** Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the need for qualitative pharmacist productivity tools

Identify barriers to capturing qualitative pharmacist productivity data

Self Assessment Questions:

Which of the following supports the utilization of a pharmacist productivity tool that incorporates qualitative data?

- A: Accounts for clinical activities that may improve patient outcomes
- B: Minimizes the need for standardized documentation of clinical services
- C: May result in downsizing of clinical pharmacy services provided
- D: Quantitative data provides no benefit in evaluating productivity

Which of the following is a barrier to accurately capturing and analyzing pharmacist productivity?

- A: Qualitative pharmacy data is readily available for interpretation
- B: Many cost-effective software tools exist, making it difficult to choose
- C: Clinical services provided by pharmacists are evolving
- D: The need for more quantity-driven measurements of productivity

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-852L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATING THE HIV CONTINUUM OF CARE WITHIN A LARGE INTEGRATED HEALTH SYSTEM

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Purpose: In 2013, the Centers for Disease Control and Prevention sought to gain a comprehensive understanding of the United States HIV population. Referenced as the HIV Care Continuum, the project categorized patients along a five-step pathway to viral suppression following a formal HIV diagnosis. The state of Wisconsin Department of Health Services performed a similar evaluation of the state's HIV population, utilizing the same methodology. In response to both the national and statewide results, this project sought to describe the HIV continuum of care within Aurora Health Care, a large integrated health system. Secondary objectives aimed to address potential gaps along this internal continuum and compare to national and statewide data. **Methods:** Patients ≥ 13 years of age with a positive HIV antigen/antibody and/or HIV rapid antigen test(s) between January 2012 and August 2016 were queried and reviewed via the electronic health record to determine each patient's place along the HIV continuum of care. Patients with a false positive test were excluded. The overall HIV continuum of care within our health system was then constructed and compared to national and statewide data. **Results:** Of 79,442 HIV antigen/antibody and HIV rapid test collections, 86 unique patients met our inclusion criteria. Among these patients: 70.9% were linked to care, 58.1% remained engaged in care, 34.9% were retained in care, and 45.3% achieved viral suppression within one year after HIV diagnosis. **Conclusions:** Our internal linkage to care results lie near the midpoint of available national and state of Wisconsin data. Retention in care offered the greatest opportunity compared to statewide data. To this end, we will investigate internal resources to improve linkage to care and patient retention, as the latter revealed a strong correlation to viral suppression. We recommend replication of this evaluation at other institutions in which patients are diagnosed with HIV.

Learning Objectives:

Recall the basics of HIV including, but not limited to the following: transmission, diagnosis, management, and outcomes.

Recognize the importance of addressing gaps in the HIV continuum of care and potential strategies for gap resolution.

Self Assessment Questions:

Which of the following is true regarding HIV?

- A A majority of HIV transmissions occur from open wounds exposed
- B Dual diagnosis of HIV and AIDS occurs when an individual tests p
- C Antiretroviral therapy should only be initiated when the CD4 count
- D According to CDC data, nearly 2/3 of patients with HIV have achie

Which method of continuum of care gap closure discussed has been shown to significantly improve patient follow-up rates within a year of HIV diagnosis?

- A Admit the patient to an inpatient floor once HIV diagnosis is estab
- B Utilize a text messaging service to provide appointment reminders
- C Implement a case manager role to re-engage patients
- D Refrain from contacting the patient regarding appointment remind

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-714L02-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATING CHEMOTHERAPY DOSE RANGE CHECKING UPDATES AT INDIANA UNIVERSITY HEALTH

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Purpose: In 2010, it was estimated that \$21 billion of wasteful spending goes toward preventable medication errors annually in the United States. As medical technologies improve and electronic health records are more customizable, new opportunities for error prevention become available. The narrow therapeutic windows of chemotherapy agents cause risk of being ineffective at too low of a dose or being toxic to the point of morbidity or mortality at too high of a dose. Dose range checking (DRC) should be optimized to reduce this error risk. Many current chemotherapy DRC alerts at Indiana University Health are inappropriate and are based on reaction as compared to a proactive review. Chemotherapy DRC alerts at Indiana University Health are presented only to pharmacists during verification. The primary objective of this study is to evaluate rates of chemotherapy DRC alerts before and after implementation of Indiana University Health system-wide updates to chemotherapy dose ranges. **Method:** This study will include two phases. Phase 1 will evaluate previously accepted chemotherapy dose ranges which will have been in place for 6 months or greater and become outdated. Phase 2 will evaluate newly updated ranges based on system standards and input from Indiana University Health's Chemotherapy Safety Committee. Evaluation of dose range alerts fired for one month prior and for one month after the updates will be utilized to assess system standards and pharmacist adherence to these standards. A survey will be sent to pharmacists before and one month after implementation of the new dose ranges and will be utilized to assess satisfaction with the updated ranges. A system-wide evaluation of incident reports concerning chemotherapy agents for one month prior and for one month after the updates will be utilized to assess the appropriateness of the ranges involved in each phase. **Results and Conclusions:** Pending data collection and analysis.

Learning Objectives:

Explain how under-dosing and over-dosing chemotherapy can lead to patient harm and corrective medical care.

Recognize drawbacks of using a reactive approach to updating chemotherapy dose range checking.

Self Assessment Questions:

In the United States, how many inpatient admissions and outpatient visits involving serious medication errors are thought to be potentially avoidable?

- A 500 thousand
- B 2 million
- C 4 million
- D 7 million

Which of the following options is a potential risk when under-dosing or over-dosing chemotherapy?

- A Failure of therapy due to inappropriate chemotherapy selection
- B Toxicity leading to hospitalization
- C Morbidity or mortality associated with an inappropriate chemothera
- D All of the above

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-967L05-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) DISCHARGE PRESCRIBING PRIOR TO AND POST IMPLEMENTATION OF A PHARMACIST-DRIVEN, EVIDENCE-BASED PROTOCOL IN A RURAL COMMUNITY HOSPITAL SETTING

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Purpose: At 10.4%, Kentucky has the highest COPD prevalence in the nation; nearly 380,000 Kentuckians have been diagnosed. Failure to treat high-risk COPD patients according to Global Initiative for Chronic Obstructive Lung Diseases (GOLD) guideline treatment regimens may lead to inadequate therapy and increase risk of hospital readmission. The primary objective of this research is to evaluate and compare discharge prescriptions for COPD patients to GOLD guidelines pre- and post-implementation of a pharmacist-driven discharge protocol. A secondary objective will be to identify patient-reported barriers to filling prescribed COPD discharge prescriptions. **Methods:** A retrospective chart review will be completed to establish baseline-prescribing habits of COPD medications upon discharge. A pharmacist-driven, evidence-based protocol will be developed based on current GOLD first-choice recommendations. After implementation of the protocol, concurrent review of medical charts will be completed to identify COPD patients meeting inclusion criteria. Once identified, patients will be asked for written informed consent. A survey will be administered to assess current symptoms using a modified version of the COPD Assessment Test (CAT). After scoring, this assessment will place COPD patients in one of two possible classes as outlined by GOLD guidelines, and ultimately dictate the medications prescribed at discharge. Five additional questions will be asked that will help identify patient perception of their clinical status and any barriers reported in obtaining or complying with COPD medications. During the study period, the discharging pharmacist will review prescriptions and make appropriate changes as necessary per protocol to meet GOLD guidelines. An evaluation and comparison will be made between COPD discharge medications and GOLD guidelines first-choice recommendations to determine appropriateness. Comparisons will be made between discharge prescriptions for COPD patients pre- and post-implementation of the protocol. **Results:** Data collection and analysis is currently underway and will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

List the recommended first-choice pharmacologic agents for hospitalized patients in Patient Groups C and D according to the Global Initiative for Chronic Obstructive Lung Diseases (GOLD) guidelines.
Identify a validated questionnaire recommended for a comprehensive assessment of COPD symptoms per the GOLD guidelines.

Self Assessment Questions:

According to the Global Initiative for Chronic Obstructive Lung Diseases (GOLD) guidelines, which of the following is a recommended first-choice regimen for a patient in Group C or D?

- A: Long-acting beta-2 agonist
- B: Inhaled corticosteroid + long-acting beta-2 agonist
- C: Short-acting beta-2 agonist + short-acting anticholinergic
- D: Theophylline

According to the Global Initiative for Chronic Obstructive Lung Diseases (GOLD) guidelines, which of the following questionnaires is recommended for a comprehensive assessment of symptoms?

- A: British Medical Research Council (mMRC) scale
- B: Forced Expiratory Volume in one second (FEV1)
- C: COPD Assessment Test (CAT)
- D: CURB-65 score

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-500L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATING EFFICACY AND SAFETY OF A VANCOMYCIN DOSING PROTOCOL IN OBESE PATIENTS

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Purpose: After many decades, vancomycin remains a mainstay of treatment due to its vast supporting literature, low cost, and the desire to minimize exposure to newer agents to avoid resistance. Obesity has been a factor that has challenged each of these qualities, making the use of vancomycin problematic in this population. Despite being widely studied in this population there is little consensus on dosing strategies, and clinicians struggle to obtain safe and therapeutic troughs. This retrospective review will demonstrate whether the dosing protocol of the institution being studied is equally safe and effective in obese and non-obese patients. **Methods:** This observational study is a single-center retrospective chart review. Data was collected from the electronic medical records of patients who received intravenous vancomycin from June 1, 2016 through August 31, 2016. Patients were included if they were at least 18 years old and had a minimum of one vancomycin trough drawn during treatment. Patients with end stage renal disease, baseline creatinine clearance ≤ 20 mL/min, or who were pregnant were excluded. The two cohorts consist of obese (BMI ≥ 30 kg/m²) and non-obese. The primary objective of this study is to determine the proportion of patients who achieved the target vancomycin trough at the first level in these two groups. Secondary objectives are to evaluate rates of subtherapeutic, therapeutic, and supratherapeutic troughs, in addition to nephrotoxicity, throughout treatment. **Results:** 138 (62 obese, 76 non-obese) patients were evaluated, with obese patients demonstrating a higher rate of therapeutic first troughs than non-obese patients (35.5% vs 31.6%). Obese patients also had more supratherapeutic first troughs (11.3% vs 8.1%) and fewer subtherapeutic first troughs (52.8% vs 59.7%). These rates were similar when evaluating all troughs collected. Three patients in each group developed nephrotoxicity. **Conclusions:** Statistical tests will be performed to determine the significance of the results.

Learning Objectives:

Discuss patient factors that may lead to non-therapeutic vancomycin troughs

Recognize appropriate vancomycin trough goals based on the type of infection being treated

Self Assessment Questions:

Which of the following has been associated with vancomycin toxicity?

- A: Total daily vancomycin dose greater than 3 grams
- B: Total body weight >101.4 kg
- C: Estimated creatinine clearance <100 mL/min
- D: APACHE II score <21

A goal trough of 15-20 mcg/mL is desirable in which of the following indications?

- A: Cellulitis
- B: Urinary tract infection
- C: Bacteremia
- D: Leukocytosis

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-448L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

FACTOR VIIA ADMINISTRATION IN CARDIOTHORACIC TRANSPLANT AND ITS IMPACT ON THROMBOEMBOLIC EVENTS AND POST-TRANSPLANT OUTCOMES

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Purpose: Cardiothoracic transplants are likely to be accompanied by an increased risk of bleeding. In response, surgeons will give blood products as well as factor products such as recombinant, activated factor VIIa for refractory coagulopathic bleeding. Recent studies in cardiac patients report reduction in transfusion requirements, but an increase in thromboembolic events in patients treated with factor VIIa. As cardiothoracic transplant patients are at increased risk of thromboembolic events, it is unclear if factor VIIa exacerbates this risk. The primary objective of this study is to determine if factor VIIa use for refractory coagulopathic bleeding in cardiothoracic transplant recipients leads to a higher incidence of thromboembolic events post-transplant compared to those who do not receive the drug. Secondary objectives include the evaluation of the impact of factor VIIa use on post-transplant outcomes including patient and graft survival, acute rejection, and hospital readmissions. **Methods:** Single-center, retrospective, cohort study to be conducted in cardiothoracic transplant recipients who received intraoperative or post-operative factor VIIa for refractory coagulopathic bleeding from January 2013-December 2015. Patients less than 18 years of age and combination organ transplant recipients are excluded. The student's t-test will be used for statistical analysis of continuous variables and categorical variables will be analyzed via the chi-square or Fisher's exact test. Patients will be evaluated at fixed time points after factor VII administration. **Results and Conclusion:** Data collection and analysis is ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference. Current sample size is 62 patients. Of those patients, the median age is 53, there are 43 men, and 45 of these patients were listed as status 1A at time of transplant.

Learning Objectives:

Review the coagulation cascade and the effect of factor VIIa

Recognize the possible complications of cardiothoracic transplant that may lead to increased risk of thromboembolic events

Self Assessment Questions:

Which factor does activated factor VII act upon?

- A Factor X
- B: Factor IX
- C: Factor IIX
- D: Factor Xa

Which of the below factors may contribute to a heart transplant recipients increased risk of thromboembolic events?

- A Time on cardiopulmonary bypass
- B Choice of sedation
- C Age
- D Panel Reactive Antibody (PRA) percentage

Q1 Answer: A Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-409L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF A RISK STRATIFICATION GUIDELINE FOR THE TREATMENT OF NEUTROPENIC FEVER

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Purpose: Neutropenic fever (NF) is a common complication developing in approximately 10-50% of patients with solid tumors and > 80% of patients with hematologic malignancies undergoing chemotherapy. Approximately 23% of NF cases are related to bacteremia, with higher mortality attributed to infections caused by gram-negative pathogens, specifically *Pseudomonas aeruginosa*. Therefore, empiric anti-pseudomonal (AP) coverage is critical for patients with NF. However, the Infectious Disease Society of America guideline does not make specific recommendations as to which AP agent should be used.

Traditionally at Froedtert Hospital, patients were prescribed meropenem as empiric therapy for NF despite a low incidence of resistant pathogens. In June 2016, Froedtert Hospital implemented new guidelines for the treatment of NF. This guideline was designed to guide initial AP antibiotic selection as well as indications for therapy escalation and de-escalation based on risk factors for multi-drug resistant (MDR) gram-negative infections. Risk factors include broad-spectrum antibiotics for 14 days or more in the past 90 days, sepsis and history of MDR gram-negative infection. Risk stratification serves to reserve broadest spectrum antimicrobials (i.e. meropenem) for patients at highest risk of MDR organisms in an effort to prevent development of resistance. **Methods:** The goal of this project is to analyze patients treated for NF before and after guideline implementation at Froedtert Hospital. Patients who were at least 18 years old, treated for NF and admitted Jan 1, 2015 to June 30, 2015 and June 23, 2016 and Dec 31, 2016 will be included. Evaluated outcomes of this single center, retrospective chart review will include the incidence of inappropriate empiric antimicrobial therapy, 30-day all-cause mortality from initial febrile episode, adherence to the guideline, time from fever to initial AP therapy, and percentage of patients receiving meropenem in both groups. Data collection and analysis are ongoing. Results and conclusions will be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Explain the benefits of risk-stratified empiric anti-pseudomonal beta-lactam antimicrobials for patients with febrile neutropenia

Recognize risk factors for patients that should receive empiric antimicrobial therapy covering MDR gram-negative organisms (i.e. carbapenem) for neutropenic fever.

Self Assessment Questions:

1. According to IDSA guidelines for neutropenic fever, which of the following is the recommended anti-pseudomonal agent of choice for empiric coverage?

- A meropenem
- B: cefepime
- C: piperacillin/tazobactam
- D: the guidelines do not give a specific recommendation for anti-pse

2. Neutropenic fever occurs in what percent of patients with a hematologic malignancy undergoing conventional cytotoxic chemotherapy

- A 20%
- B 40%
- C 60%
- D 80%

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-363L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EVALUATION OF A PHARMACIST-DRIVEN SERVICE FOR THE MANAGEMENT OF PATIENTS WHO ARE ONE YEAR STATUS-POST BARIATRIC SURGERY

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Purpose: Bariatric surgery requires permanent changes in the approach to medication administration, lifestyle, and overall healthcare. In 2012, William S. Middleton Memorial Veterans Hospital implemented a process by which pharmacists assist the health care team to individually tailor medications to meet the needs of the unique post-bariatric surgery patient. This process includes scheduled pharmacist follow-up visits post-surgery to assess the patients' medications and adherence, interpret pertinent lab parameters, and make adjustments as needed. The purpose of this study is to evaluate adherence to the current protocol in place for the post-operative care of bariatric surgery patients by clinical pharmacists. **Methods:** This was a retrospective chart review quality improvement study specific to the Madison VA. Patients that underwent bariatric surgery at the Jesse Brown VA Medical Center during or after 2012 who were then referred to a PACT Pharmacist for post-operative management were identified by a positive prescription history for receiving at least one of the following non-formulary supplements reserved for bariatric surgery patients: calcium citrate 500mg + vitamin D3 300 IU + vitamin K 20mcg, multivitamin + iron, cyanocobalamin 2,500mcg sublingual tablet. Data was collected through review of each study subject's chart over the course of the first year post surgery. Patient-specific data collected includes referring clinic, type and date of surgery, age, gender, number of mental health visits, date of follow-up pharmacist visits, and lab work collected at time of follow-up including: BP, CBC, BMP, Mg, Phos, Albumin, Liver Panel, Lipid Profile, HBA1C (for Diabetics), B12, Folate, Iron, Ferritin, TIBC, and Vitamin D-25-OH. The primary outcome is the percentage of pharmacist visits completed according to protocol. Secondary outcomes include percentage of proper lab monitoring according to protocol and number of pharmacist-driven interventions. **Results/Conclusions:** Data collection and analysis is currently in progress and will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the responsibilities of a PACT pharmacist in the management of post-operative bariatric surgery patients.

Identify the vitamins and minerals imperative to the proper long-term management and well-being of post-operation bariatric surgery patients.

Self Assessment Questions:

Which of the following is a true statement regarding the PACT pharmacists' role in the management of post-operative bariatric surgery patients?

- A: Management of post-operative bariatric surgery patients should be
- B: Pharmacists may evaluate post-operative bariatric surgery patients
- C: Pharmacists are an integral member of the health care team and a
- D: Pharmacists may assist with the management of post-operative bariatric surgery patients

After bariatric surgery, patients are at an increased risk of developing anemia secondary to potentially inadequate amounts of which of the following nutrients:

- A: Vitamins B12
- B: Vitamin D
- C: Iron
- D: A and C

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-613L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ASSOCIATION OF THIAMINE WITH OUTCOMES IN SEPTIC SHOCK PATIENTS

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Purpose: Thiamine is an essential component of aerobic metabolism in humans, specifically as a co-factor in the conversion of pyruvate to acetyl co-enzyme A. Deficiency in this co-factor prevents the Krebs cycle from functioning properly, leading to deleterious effects including lactic acidosis, hypotension, and potentially death. Mounting evidence has shown that critically ill patients are commonly thiamine deficient. Furthermore, patients presenting with septic shock develop symptoms mirroring that of thiamine deficiency. Prior studies have demonstrated that thiamine supplementation in septic shock was associated with decreased serum lactate levels at 24 hours, and possibly lower in-hospital mortality in patients with a confirmed thiamine deficiency, though the overall benefit to the septic shock population as a whole is not known. The primary objective for this study was to determine if thiamine supplementation reduces time to lactate clearance (time to serum lactate level < 2 mmol/L), for patients presenting with septic shock. Secondary objectives include peak lactate levels during hospitalization, time on vasopressors, sequential organ failure assessment (SOFA) scores on days 1-5 of hospitalization, incidence of acute kidney injury, incidence of dialysis initiation in the ICU, duration of mechanical ventilation, ICU and total hospital length of stay, and in-hospital mortality. **Methods:** A single-center, retrospective, cohort study was conducted in adult patients, that were admitted with a diagnosis of septic shock to either the medicine ICU or surgery ICU at the University of Kentucky Chandler Medical Center between January 2008 and January 2016. Utilizing our institution's clinical data warehouse, patients that received intravenous thiamine supplementation within 24 hours of hospital admission were identified, and compared to a matched cohort of patients that did not receive thiamine. Patients were excluded if they developed septic shock after admission to the hospital.

Results and Conclusion: Preliminary results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review the importance of thiamine in aerobic metabolism, and describe the potentially deleterious effects of thiamine deficiency in critically ill patients.

Identify the potential benefit of thiamine supplementation in patients presenting to the hospital with septic shock.

Self Assessment Questions:

Why might thiamine be beneficial in septic shock resuscitation?

- A: Restoration of aerobic metabolism via supplementation of an enzyme
- B: Antibacterial properties that aid in the clearance of microorganisms
- C: Increased perfusion of peripheral tissues via thiamine's direct vascular effects
- D: Treatment of Wernicke's encephalopathy in all patients presenting with septic shock

What are potential signs and symptoms of thiamine deficiency?

- A: Lactic acidosis, hypotension, and altered mental status
- B: Hypertension, bradycardia, and altered mental status
- C: Altered mental status, hypertension, and lactic acidosis
- D: None of the above

Q1 Answer: A Q2 Answer: A

ACPE Universal Activity Number 0121-9999-17-460L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

VANCOMYCIN DOSAGES REQUIRED TO REACH SERUM TROUGH CONCENTRATION GOALS IN INTRAVENOUS DRUG USERS: A RETROSPECTIVE COHORT STUDY

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Purpose: This study was designed to determine the difference in intravenous (IV) vancomycin dosing requirements between IV drug users and non-IV drug users. The primary endpoint was total daily vancomycin dose (TDV) at time of target serum trough concentration (1 to 20 mg/L). Secondary analyses included time to achievement of target vancomycin serum trough and an evaluation of characteristics predictive of higher TDV requirements. **Methods:** This retrospective study included adults receiving vancomycin with serum trough monitoring during an inpatient hospitalization. Subjects were stratified by creatinine clearance (CLCr) into two groups: 61 to 90 mL/min and greater than 90 mL/min. Subjects who were pregnant, receiving renal replacement therapy, or with a CLCr less than 30 mL/min were excluded. Analysis was not performed on patients with CLCr 30 to 60 mg/L due to under-representation. **Results:** The median TDV for all subjects was 45 mg/kg/day. No difference was found in TDV between IV drug users and non-IV drug users, nor was a difference found within the subgroups of CLCr greater than 90 mL/min or CLCr 61 to 90 mL/min ($p=0.132$, $p=0.454$, $p=0.122$). The median time to therapeutic trough for IV drug users was 37.5 hours and for non-IV drug users was 34.6 hours ($p<0.001$). For subjects with CLCr greater than 90 mL/min, median time to therapeutic trough was 37.1 hours and 32.7 hours for IV drug users and non-IV drug users ($p=0.01$). For subjects with CLCr 61 to 90 mL/min median time to therapeutic trough was 42.7 hours in the IV drug users and 35 hours in the non-IV drug users ($p = 0.007$). **Conclusion:** IV drug users took longer to achieve therapeutic levels of vancomycin despite no difference in TDV when compared to non-IV drug users with similar renal function. Multivariate analysis and final conclusions are in process.

Learning Objectives:

Explain vancomycin pharmacokinetics and appropriate monitoring of vancomycin

Discuss the existing literature surrounding pharmacokinetic changes in IV drug users

Self Assessment Questions:

When is the most appropriate time to assess a serum trough concentration of vancomycin for patients with normal renal function (CLCr >60 mL/min)?

- A Before the first dose
- B Before the fourth dose
- C Before every dose
- D Before the second dose

What is the biggest change in pharmacokinetics in IV drug users that was found in the studies performed by Rybak and colleagues and King and colleagues?

- A Increased absorption
- B Decreased metabolism
- C Decreased excretion
- D Increased clearance

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-833L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

HYDRATION PROTOCOL AND EARLY READMISSION RATE

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The average readmission rate within 30 days of discharge after pancreas transplant was 55.5%. Currently identified risk factors for early readmission following pancreas transplant include bladder drainage, African American donor, and length of stay post-transplant. Dehydration has been the most common presentation in early readmission and it may cause orthostatic hypotension and acute kidney injury. At University of Illinois Hospital (UIH), the readmission rate following pancreas transplant is nearly 80%. The home hydration regimen was implemented in 2012 in pancreas transplant patients to prevent dehydration-related early readmission. This primary outcome of this study is to determine whether the implementation of hydration protocol resulted in a 50% reduction of early readmission rate. This is a retrospective, chart-review, historic-control study. Adult patients who had whole pancreas transplantation at UIH during 1/1/2008 - 9/30/2016 were eligible. Early readmission rate is defined as any hospitalization in the first 14 days following pancreas transplantation. Secondary outcomes are line-related issues and reasons of early readmission. Chi-square test will be used for the nominal data, Wilcoxon rank sum will be used for ordinal data and Student's t-test will be used for continuous data. Two-sided p-values < 0.05 were considered statistically significant. Preliminary data: The early readmission rate during 1/2012-9/2016 was 56.7%, compared to 78.6% during 1/2008-1/2011. However, only 36.7% patients received home hydration prescription on discharge and only 63.6% of these patients had line access available for home hydration on discharge, with tunneled central venous catheter as the most common line access (63.6%). Issues regarding the line access were encountered in 18.2% of patients with hydration protocol. **Conclusion:** The home fluid infusion strategy post-pancreas transplant decreased early readmission rate at UIH.

Learning Objectives:

Recognize the common cause of readmission post pancreas transplant.

State the rationale of implementing hydration protocol in pancreas transplant.

Self Assessment Questions:

The most common cause in readmission post pancreas transplant is:

- A Dehydration
- B Infection
- C Graft thrombosis/bleed/leak/fluid collection
- D Rejection

The potential benefits of hydration protocol in pancreas transplant include the following EXCEPT

- A Reduction in early readmission rate
- B Fewer incidents of acute kidney injury
- C Fewer incidents of hypotension
- D Less nausea/vomiting/diarrhea

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-677L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

EFFICACY OF NEUTRAL POSITION BERACTANT ADMINISTRATION IN NEONATES

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Background: Respiratory distress syndrome is commonly seen in premature infants and occurs because of insufficient production of

surfactant. Surfactant lowers the surface tension in the alveoli and prevents the lungs from collapsing. Beractant is a bovine-derived

surfactant that is used in the prevention and treatment of respiratory distress syndrome. The FDA has approved beractant to be given in

four separate aliquots while turning the neonate in four different positions to facilitate distribution of the surfactant across lung tissue.

The AAP currently states there is insufficient evidence to recommend the optimal number of fractional doses of surfactant or what body

position is best when surfactant is administered. This facility has historically administered beractant in two different positions. In April

2015, this facility implemented the "Golden Hour" initiative for neonatal resuscitation, and the administration of beractant was changed to a neutral position technique at that time for all neonates. The change to neutral position technique was done after recognition that the

administration of beractant was causing distress to the neonates. Purpose: This retrospective chart review is designed to compare the

efficacy and adverse effects of surfactant administration in neonates in a neutral position versus positioning the neonates on their left and right side. Methods: Neonates who were diagnosed with respiratory distress syndrome and received beractant during the time periods of December 1, 2013 through March 31, 2015 and May 1, 2015 through August 31, 2016 will be included in the study. The patients that received beractant during the month of April 2015 will not be included as 100% compliance with the new protocol could not be assured during this transition month. The primary outcome is the change in fraction of inspired oxygen one hour after beractant. Results/Conclusion: Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize the monitoring parameters and adverse effects for beractant
Identify the differences in the process of beractant administration between the FDA and the AAP

Self Assessment Questions:

Which of the following is an adverse effect for beractant?

- A: sepsis
- B: hyperkalemia
- C: pruritis
- D: increased LFTs

What is the correct administration of beractant in a 1 kg neonate per AAP?

- A: neutral position
- B: 2 positions
- C: 4 positions
- D: insufficient evidence

Q1 Answer: A Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-307L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

COMPARISON OF EARLY VERSUS LATE INITIATION OF LEVOFLOXACIN PROPHYLAXIS AND RATE OF BREAKTHROUGH INFECTIONS IN AUTOLOGOUS HEMATOPOIETIC STEM CELL TRANSPLANT RECIPIENTS

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Background: Autologous hematopoietic stem cell transplant (HSCT) recipients typically experience profound and prolonged neutropenia prior to myeloid engraftment. During the pre-engraftment phase, neutropenia and mucositis are the main risk factors for bacterial infection. Consensus guidelines recommend fluoroquinolones as bacterial prophylaxis in neutropenic patients based on their broad spectrum and strong clinical evidence. However, fluoroquinolone use predisposes patients at risk for clostridium difficile associated disease (CDAD). Antibiotic duration also has been identified as a risk factor for the development of CDAD. Historically at the Northwestern Memorial Hospital (NMH), levofloxacin prophylaxis was initiated on the day of stem cell infusion (day 0) and continued until myeloid engraftment. A previous NMH study of 615 autologous HSCT recipients revealed 52 new cases of CDAD (8.5%), while a low rate of other bacterial infections before day +6 post HSCT was identified. A clinical management strategy was initiated to begin levofloxacin on day +5 or the onset of neutropenia, whichever occurred sooner, in multiple myeloma patients undergoing autologous HSCT. Purpose: To investigate the impact of late initiation of levofloxacin prophylaxis on the rate of breakthrough infections, incidence of febrile neutropenia, change in surveillance culture, and broad-spectrum antibiotics use in HSCT patients.

Methods: The design is a prospective study with a historical cohort control that will be performed by reviewing the database of patients at NMH who have undergone autologous HSCT for MM with a high-dose melphalan conditioning regimen. MM patients who started levofloxacin prophylaxis on day +5 will be compared to a historical control cohort, which started levofloxacin on day 0. The primary endpoint of this study is the rate of breakthrough infections, and the secondary endpoints include the types of breakthrough infection, incidence of febrile neutropenia, change in surveillance culture and the duration of broad-spectrum antibiotics use. Results/Conclusion: Data analyses are ongoing. Research results and conclusions will be presented at the conference.

Learning Objectives:

Discuss the risk factors for the development of bacterial infection in hematopoietic stem cell transplant recipients.

Describe the evidence of fluoroquinolone prophylaxis in neutropenic cancer patients.

Self Assessment Questions:

Which of the following is NOT a risk factor for developing bacterial infections in hematopoietic stem cell transplant recipients?

- A: prolonged neutropenia
- B: mucosal damage from chemotherapy
- C: decreased ejection fraction
- D: central venous catheter placement

Which of the following statement is correct?

- A: all neutropenic patients should use fluoroquinolone prophylaxis
- B: overuse of fluoroquinolone does not increase bacterial resistance
- C: fluoroquinolone exposure has been associated with the development of CDAD
- D: compared to placebo, fluoroquinolone did not decrease the incidence of CDAD

Q1 Answer: C Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-376L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION AND EVALUATION OF AN ELECTRONIC PAIN-AGITATION-DELIRIUM ORDER SET IN A COMMUNITY TEACHING HOSPITAL

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Purpose: One third of all intensive care unit (ICU) patients are mechanically ventilated. Poor adherence to standard pain-agitation-delirium (PAD) management recommendations established by the 2013 American College of Critical Care Medicine (ACCM) is associated with prolonged mechanical ventilation and negative clinical outcomes. The objective of this study is to implement a standardized electronic PAD order set to improve adherence to the current guidelines. Secondary objectives include evaluate the use and adherence to the order set after implementation and evaluating patient outcomes. **Methods:** This study has been approved by the Institutional Review Board and it is a single center, retrospective analysis of a practice improvement project. An electronic PAD order set based on the 2013 ACCM guidelines will be created from the current paper order set. The order set will be reviewed and approved by an interdisciplinary team of physicians, pharmacists, and nurses with a goal of implementation into the electronic ordering system in 2/2017. Patients in the ICU older than 18 years of age with an ICD-10 code for mechanical ventilation will be enrolled and retrospectively reviewed before and after implementation of the order set from 11/1/2016 to 5/30/2017. Exclusion criteria include patients intubated for less than 24 hours, or with traumatic brain injury, cerebrovascular injury, or receiving paralytic infusions. Monthly education on order set utilization will be provided to nurses, respiratory therapists, and physicians in ICU. The following data will be collected: patient demographics, baseline disease states, medication usage, order set usage, length of mechanical ventilation, and length of ICU and hospital stay. All data will be recorded without patient identifiers and maintained confidentially. **Results:** Preliminary results will be presented at the Great Lakes Pharmacy Resident Conference. **Conclusions:** N/A

Learning Objectives:

Describe the sequence of pharmacologic management for intubated patients recommended by ACCM guideline
Discuss the pharmacologic agents commonly used for sedation

Self Assessment Questions:

Which following medication should be used first for intubated patients in ICU?

- A: Midazolam IV bolus
- B: Propofol IV infusion
- C: Fentanyl IV bolus
- D: Fentanyl IV infusion

Which following sedative should be the first line agent for an intubated patient who is allergic to soy?

- A: Propofol IV infusion
- B: Dexmedetomidine IV infusion
- C: Midazolam IV bolus
- D: Lorazepam IV infusion

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-530L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

UTILIZING RISK INDEX FOR OVERDOSE OR SERIOUS OPIOID-INDUCED RESPIRATORY DEPRESSION (RIOSORD) SCORES TO PRIORITIZE OFFER OF RESCUE NALOXONE IN AN OUTPATIENT VETERAN POPULATION: A TELEPHONE-BASED PILOT

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Background: Improving access to naloxone was recognized as a key strategy to reduce harm associated with substance use by the 2016 U.S. Surgeon Generals Report on Alcohol, Drugs, and Health. Despite increased attention towards the prescribing of opioids, overdose remains a major public health concern. Healthcare providers should discuss the importance of having a naloxone rescue kit with patients who have risk factors for opioid overdose. This pilot project utilizes the Risk Index for Overdose or Serious Opioid-Induced Respiratory Depression (RIOSORD) tool to identify the highest risk veterans for targeted offer of naloxone. This tool was developed in the veteran population to provide evidence-based information on the risk of overdose or life-threatening respiratory depression. It considers fifteen risk factors and stratifies patients into a risk class (1-10) corresponding with the average predicted probability of the aforementioned adverse events. **Objective:** The purpose of this pilot project is to identify primary care veterans at highest risk for serious opioid-related adverse events using RIOSORD and offer naloxone rescue kits. The primary outcome is the percentage of patients contacted that agreed to be prescribed naloxone. Secondary outcomes include comparative efficacy of phone versus letter contact and reasons for refusal of naloxone where indicated. **Methods:** Patients with a primary care provider through the William S. Middleton Memorial Veterans Hospital in Madison, WI were stratified by risk of overdose or serious opioid-induced respiratory depression using RIOSORD. Those with risk class of 8 or greater will be contacted by phone to offer a naloxone rescue kit (nasal spray or auto-injector). If a patient is unable to be reached via phone, a letter will be mailed providing information about naloxone and contact information to discuss naloxone further. Demographic information including age, gender, race, and RIOSORD risk factors will be collected. **Outcomes:** Pending at the time of abstract completion.

Learning Objectives:

Discuss naloxone distribution as a means of increasing patient safety in a high-risk population and obstacles faced by providers who wish to implement a naloxone-distribution program.

Describe and review methods utilized to offer naloxone rescue kits to patients at the highest risk of overdose or opioid-induced respiratory depression.

Self Assessment Questions:

Which of the following represents an obstacle to prescribing and distributing naloxone kits in the community?

- A: Risk of adverse effects if used properly
- B: Need for face-to-face education before using a device
- C: Prescriber time limitations
- D: Restrictive state laws

Which of the following is taken into consideration by RIOSORD?

- A: Suicide attempt by overdose one year ago
- B: Alcohol use
- C: Concomitant use of a sedative hypnotic
- D: Recent hospitalization for hypoglycemia

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-947L05-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ASSESSMENT OF DEVIATION FROM EVIDENCE-BASED, NEO-ADJUVANT AND ADJUVANT TREATMENT PLANS IN PATIENTS WITH EARLY-STAGE BREAST CANCER

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Purpose Neo-adjuvant and adjuvant therapy in early-stage breast cancer (ESBC) has been shown to improve overall survival. Adherence to guideline-based regimens, in terms of dose and frequency, are important predictors of outcomes and can be quantified by calculating the relative dose intensity (RDI). Evidence shows that the efficacy of chemotherapy therapy is greatly diminished when the RDI falls below 85%. The RDI of chemotherapy regimens can be calculated by comparing the dose, number of cycles, and cycle interval with standard recommendations in the National Comprehensive Cancer Network (NCCN) breast cancer guidelines. The primary objective of this study is to determine the rate at which Norton Cancer Institute (NCI) patients deviate from recommended treatment regimens per the NCCN Breast Cancer guidelines with regard to RDI. **Methods** This study is an IRB-approved, retrospective chart review of adult patients with ESBC, defined as stage I to III, receiving neo-adjuvant or adjuvant chemotherapy at NCI. Beginning January 1, 2015, the first 150 patients that met these inclusion criteria were identified. Exclusion criteria included those patients with metastatic cancer, those not prescribed chemotherapy, patients assigned a treatment goal of palliative, maintenance, or supportive, and those patients that had not completed therapy at the time of evaluation. The primary objective of the study is determined by assessing the initial dose of medications as well as adherence to the recommended regimens based on infusion records and calculation of RDI. For patients that have reductions in RDI, secondary objectives include determination of the reason for dose reduction, the extent of reduction, the appropriateness of reduction, and the use of supportive therapy. **Results and Conclusions** Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the relative dose intensity of adjuvant chemotherapy that has been shown to improve survival for patients with early-stage breast cancer.

Describe the appropriate indications for reducing dose intensity of chemotherapy regimens.

Self Assessment Questions:

In the adjuvant treatment of early-stage breast cancer, patients receiving less than _____ of the intended dose had worse survival outcomes.

- A: 80%
- B: 85%
- C: 90%
- D: 100%

Which would be an appropriate indication for dose reduction or delay of chemotherapy?

- A: Grade 2 chemotherapy-induced nausea and vomiting
- B: Neutropenia that improved with use of growth factor
- C: Development of fatigue and alopecia
- D: Presence of fever in a patient with a central line

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-453L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF A MEDICATION SYNCHRONIZATION SERVICE ON PHARMACY WORKFLOW

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Purpose: to evaluate the impact of a medication synchronization service on workflow metrics within an outpatient pharmacy. **Methods:** a medication synchronization service was developed and implemented in an attempt to streamline workflow processes in an outpatient pharmacy. Patient enrollment began in July 2016 and is scheduled to conclude in March 2017. Workflow metrics such as the number of prescriptions returned to stock per day, the number of partial prescriptions filled per day due to inventory shortages, the number of visits to the pharmacy per month, and the number of phone calls to the pharmacy per month will be documented throughout the implementation period and compared to baseline data. Patient satisfaction and adherence surveys will be administered to patients upon enrollment and at the end of the implementation period for comparison. **Results:** to be determined. **Conclusions:** anecdotally, medication synchronization services appear to have a positive impact on pharmacies and the patients they serve. This quality improvement project has the potential to contribute to a growing body of knowledge highlighting its value, and thus may inform pharmacists decision-making regarding implementation of similar services.

Learning Objectives:

Discuss past and future studies examining medication synchronization services

Describe factors that can contribute to prescription nonadherence

Self Assessment Questions:

Which of the following factors related to prescription nonadherence can be best addressed through a medication synchronization service?

- A: Multiple visits to the pharmacy
- B: Forgetfulness
- C: Medication regimen complexity
- D: All of the above

What are the benefits of medication synchronization seen in past studies?

- A: Increased patient adherence
- B: Increased monthly prescription volume
- C: Increased pharmacy revenue
- D: All of the above

Q1 Answer: D Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-742L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

VASOPRESSIN PLASMA CONCENTRATIONS IN RESPONDERS AND NON-RESPONDERS TO EXOGENOUS VASOPRESSIN INFUSION IN PATIENTS WITH SEPTIC SHOCK

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Purpose: A "relative deficiency" of vasopressin is theorized to exist in patients with septic shock. Endogenous vasopressin levels are initially elevated but quickly fall to levels at or below those of normal physiology due to depletion of endogenous stores. This has led to the addition of exogenous arginine vasopressin (AVP) to exogenous catecholamines to increase mean arterial pressure (MAP) and decrease catecholamine requirements in patients with vasodilatory shock. Previous data have suggested that increasing AVP doses (and, by inference, increasing plasma concentrations) will lead to increasing MAP. However, the relationship between plasma vasopressin levels and hemodynamic response is not clear. In a retrospective study, factors previously associated with increased plasma vasopressin concentration were not associated with hemodynamic response, suggesting that a dose-response relationship between plasma vasopressin concentration and hemodynamic response may not exist. The purpose of this study is to compare plasma vasopressin concentrations in hemodynamic responders and non-responders to AVP in septic shock. **Methods:** Blood samples will be prospectively collected 3-6 hours after initiation of fixed-dose AVP and centrifuged. The plasma will be frozen and analyzed in batch. Adult patients will be included if they are treated in a medical, surgical, or neurosciences ICU with fixed-dose AVP as an adjunct to catecholamines. Patients will be excluded if AVP is the sole vasoactive therapy, is used for an indication other than septic shock, or is titrated before a blood sample is obtained. Secondary objectives include determination of a plasma vasopressin concentration associated with hemodynamic response and determination of factors associated with hemodynamic response to AVP. Hemodynamic responders and non-responders will also be compared in regards to ICU mortality, in-hospital mortality, and presence of acute kidney injury according to the RIFLE criteria. **Results and Conclusion:** To be presented at Great Lakes Pharmacy Residency Conference

Learning Objectives:

Describe factors associated with elevated plasma vasopressin concentration

Define the association between factors associated with increased plasma vasopressin concentration and hemodynamic response

Self Assessment Questions:

Which of the following is associated with increased plasma vasopressin concentration?

- A Concomitant corticosteroid administration
- B: Pneumonia as the source of infection in septic shock
- C: Female sex
- D: Obesity

True or False: Factors associated with increased plasma vasopressin concentration have consistently been associated with increased rates of hemodynamic response

- A True
- B True
- C False
- D False

Q1 Answer: A Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-341L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACTS OF A PHARMACIST-DRIVEN INTERVENTION ON DECREASING INAPPROPRIATE USE OF PROTON PUMP INHIBITORS

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Purpose: Over the years, proton pump inhibitors (PPIs) have become one of the most widely prescribed medications for conditions ranging from simple heartburn to chronic hypersecretory syndromes. However, long-term use, especially for inappropriate indications, is increasingly common. This can lead to a myriad of side effects, such as an increased risk of bone fracture, kidney damage, deficiencies in key vitamins and minerals, neurological impacts, and infections such as community-acquired pneumonia and Clostridium difficile associated diarrhea. Following a previous project that identified a need to optimize the prescribing trend for PPIs at the William S. Middleton Veterans Memorial Hospital, the purpose of this study is to implement a pharmacist-led phone intervention to successfully and safely carry out a PPI taper for predetermined primary care patients who qualify. **Methods:** This is a single-center, prospective, quality improvement project involving patients from three pre-specified Patient Aligned Care Teams (PACTs) in a Veterans Affairs (VA) outpatient ambulatory care clinic setting. Patients are required to have had active 90-day prescriptions with refills for specified PPIs. If appropriate, PPI usage is tapered based on an institution-specific algorithm approved by the Pharmacy and Therapeutics Committee. Telephone outreach is performed to receive patient consent to taper PPI doses, switch to a histamine-2 receptor antagonist (ranitidine), or discontinue PPI use. Subsequent follow-up phone calls are made based on the algorithm for a max of three pharmacist-initiated phone encounters; however, patients may call as needed with questions. The results and conclusions are still pending and will be presented at the conference.

Learning Objectives:

Recognize the impact of chronic PPI use on individuals and the healthcare system

Outline an appropriate PPI tapering algorithm based on different PPI doses

Self Assessment Questions:

Which of the following is TRUE regarding chronic PPI use?

- A PPIs are benign, well-tolerated medications with almost no risk of
- B: Potential side effects can include decreased bone mineral density
- C: There are no indications for chronic PPI use
- D: Simple heartburn by itself is a valid indication for chronic PPI use

Which of the following is an appropriate medication option when patients stop PPI use but still want a scheduled medication for recurrent heartburn symptoms

- A Ranitidine 10mg daily
- B Ranitidine 50mg daily
- C Ranitidine 150mg daily
- D Ranitidine 500mg daily

Q1 Answer: B Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-961L05-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

COMPARISON OF PHENYTOIN AND LEVETIRACETAM FOR SEIZURE PROPHYLAXIS IN PATIENTS WITH A SEVERE TRAUMATIC BRAIN INJURY

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The Brain Trauma Foundation recently released guidelines for the management of severe traumatic brain injury. These guidelines provided a level II recommendation for the use of phenytoin to decrease the incidence of early post-traumatic seizures (within 7 days of trauma). However, due to minimum adverse effects and drug interactions and the lack of required drug monitoring, levetiracetam has increasingly been utilized for seizure prophylaxis. There have been few studies conducted comparing the efficacy of phenytoin and levetiracetam. The objective of this study is to determine whether phenytoin or levetiracetam is more effective in reducing the incidence of early seizures in patients with a severe traumatic brain injury. This is a retrospective, single center study performed at Advocate Christ Medical Center in adult patients from January 1, 2013 to December 30, 2016 with a Glasgow Coma Score (GCS) of 8 or less receiving phenytoin or levetiracetam following a traumatic brain injury confirmed with radiographic imaging. Patients with a history of seizures or previously taking antiepileptic medications and pregnant women were excluded. The primary outcome of this study is clinical and electroencephalogram (EEG) seizure rates within 7 days of severe traumatic brain injury. Secondary outcomes include late (7 days) seizure rates, mortality, and adverse drug reactions. The following data points were collected: length of stay (LOS), Injury Severity Score (ISS), GCS, weight, use of concomitant antiepileptic medications, dose of antiepileptics administered, use of hyperosmolar therapy, type of trauma, neurosurgical intervention, serum phenytoin levels, and seizure onset. Results and conclusions will be presented at the 2017 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain the use of seizure prophylaxis following a traumatic brain injury
Describe the potential role of phenytoin and levetiracetam in patients with a severe traumatic brain injury

Self Assessment Questions:

Following a severe traumatic brain injury, a patient is at what likelihood of developing a seizure?

- A 3 – fold increase
- B: 17 – fold increase
- C: 10 – fold increase
- D: 25 – fold increase

Which CYP P450 isoforms does phenytoin strongly induce?

- A Cyp3a4
- B Cyp2c9
- C Cyp2c19
- D All of the Above

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-653L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

THE APPROPRIATENESS OF ARGATROBAN USE IN A COMMUNITY HOSPITAL

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Purpose: Heparin Induced Thrombocytopenia (HIT) is an immune mediated IgG drug reaction diagnosed by the combination of clinical findings using a validated scoring system such as 4T score, and laboratory testing. HIT is managed by stopping all forms of heparin and initiating alternative anticoagulants, including the direct thrombin inhibitor argatroban. Some recent literature recognized an over diagnosis of HIT resulting in overuse of argatroban. Therefore, this study was conducted to evaluate the use of argatroban at Henry Ford Macomb Hospital and the appropriateness of diagnosing HIT. Methods: This study was approved by Henry Ford Institutional Review Board. Using the electronic health record, we conducted a retrospective chart review of 50 patients who were prescribed argatroban from November, 2015 through December, 2016. Patients 4T clinical scores were calculated and patients were classified into high, intermediate and low probability groups. The scores were further correlated with the HIT antibodies testing and serotonin release assays (SRA). Patient demographic information was collected, in addition to argatroban order date, length of therapy, calculated 4T score, heparin induced antibodies test results and serotonin release assays results (if collected). Results: Will be presented at the Great Lakes Pharmacy Residency Conference. Conclusions: Will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify possible causes for the overuse of argatroban for suspected HIT
Review possible measures to improve HIT diagnosis

Self Assessment Questions:

Which of the following is a possible cause of thrombocytopenia?

- A Sepsis
- B: Disseminated intravascular coagulation (DIC)
- C: Medications
- D: All of the above

Which of the following statements is correct?

- A SRA should always be ordered to confirm the diagnosis of HIT
- B 4T clinical score can be used alone to diagnose HIT
- C HIT is diagnosed by the combination of clinical findings and labors
- D All of the above are correct

Q1 Answer: D Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-402L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

ANTICOAGULATION APPROPRIATENESS IN ELDERLY PATIENTS WITH CHRONIC ATRIAL FIBRILLATION

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Purpose: Atrial fibrillation is the most common sustained cardiac arrhythmia, and the incidence of atrial fibrillation greatly increases with age. Patients with atrial fibrillation are at greater risk for thrombus formation, and subsequently are at greater risk for stroke. The University of Louisville Physician (ULP) group is a multispecialty physician practice that services a wide patient group in the Louisville area. There is no standardized protocol to identify the appropriateness of anticoagulation prescribing in elderly patients. Many clinicians are unaware of the clinical utility of the Screening Tool of Older Persons potentially inappropriate Prescriptions (STOPP) and the Screening Tool to Alert to Right Treatment (START) criteria, which provides expert recommendations on appropriate anticoagulation in atrial fibrillation and concomitant therapies to avoid for bleed risk mitigation. The purpose of this study is to assess appropriateness of anticoagulation in elderly patients with chronic atrial fibrillation in the ULP patient population. **Methods:** This study is a retrospective cohort. For this study, 5 of the 80 STOPP criteria and 2 of the 34 START criteria were selected to assess potential inappropriateness of anticoagulation therapy in elderly patients. Any ULP patients that are 65 years or older and have a diagnosis of chronic atrial fibrillation will be included. Patients with a myocardial infarction within the past year and/or an acute coronary syndrome within the past 6 months will be excluded. Patients will be assessed for concurrent drugs that could increase bleeding risk. Additionally appropriateness of renal dosing for direct oral anticoagulants will be assessed. For chronic atrial fibrillation patients without anticoagulation or aspirin therapy, a review of the patients chart will be conducted to identify any documented contraindications for anticoagulant use. **Results and Conclusion:** Data collection and analysis is ongoing and final results will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review current guideline recommendations for the use of anticoagulation in chronic atrial fibrillation

Describe the under utilization of anticoagulation in patients with atrial fibrillation

Self Assessment Questions:

Which of the following is a similarity between the recommendations in the 2014 AHA/ACC/HRS and 2016 ESC atrial fibrillation guidelines regarding anticoagulation?

- A: Consider anticoagulation in patients with an additional CHA₂DS₂-V
- B: Use of antiplatelet drugs for stroke prevention
- C: Use of aspirin in patients with a CHADS₂ score of 0 for stroke prevention
- D: Use of the CHA₂DS₂-VASC scoring system

Which of the following may be a reason for anticoagulant under prescribing in elderly patients?

- A: Decreased bleeding risk
- B: Increased bleeding risk
- C: Decreased thrombosis risk
- D: Increased thrombosis risk

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-713L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

TOCILIZUMAB FOR FIRST-LINE THERAPY FOR STEROID-REFRACTORY ACUTE GRAFT-VERSUS-HOST DISEASE: ANALYSIS OF A SINGLE-CENTER EXPERIENCE

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Purpose: Graft-versus-host disease (GVHD) is a common complication after allogeneic hematopoietic stem cell transplant (allo HSCT) and is associated with significant transplant-related morbidity and mortality. Despite improvements in post-transplant immunosuppression and use of reduced-intensity conditioning regimens, current estimates of acute GVHD (aGVHD) range between 10-80%. Steroids are first-line therapy for aGVHD however, only 25% to 40% of patients will have a complete response. For patients that fail to respond or progress after steroids, second-line therapy should be initiated promptly. There currently is no standard therapy for steroid-refractory aGVHD (SR aGVHD). Tocilizumab is a humanized interleukin-6 (IL-6) receptor antibody antagonist that blocks IL-6 signaling. Previously published reports describe successfully treating patients for SR aGVHD with tocilizumab 8 mg/kg every 3-4 weeks. Based on internal data and experience, our institutional standard for SR aGVHD is tocilizumab. **Methods:** This is a retrospective chart review of patients who underwent allo HSCT and met our institutions definition of SR aGVHD between April 2014 and December 2016. Patients included were treated with off label tocilizumab 8 mg/kg every 2-3 weeks. Acute GVHD response was assessed by the International Bone Marrow Transplant Registry (IBMTR) scoring system and validated by the BMT physician principal investigator. Acute GVHD grading and staging was assessed according to the consensus criteria. Toxicity was assessed using the National Cancer Institute (NCI) Common Terminology Criteria for Adverse Events (CTCAE, version 4.03). The primary objective is to evaluate the response of tocilizumab as first-line treatment for SR aGVHD. Secondary objectives include evaluating the safety of tocilizumab, the efficacy of tocilizumab for different types of SR aGVHD (i.e. skin, gastrointestinal tract, liver), and defining a timeline for tocilizumab therapy for the treatment of SR aGVHD treatment.

Results/Conclusion: Data collection and analysis are pending. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize the risk factors associated with developing acute graft-versus-host disease (aGVHD) in recipients of allogeneic hematopoietic stem cell transplants (allo HSCT).

Describe how aGVHD is graded and which primary organs are affected.

Self Assessment Questions:

Which factor below is associated with a higher risk for developing aGVHD after allo HSCT?

- A: Past red blood cell infusions
- B: Female donor to male recipient
- C: Herpes simplex virus infection status
- D: Reduced intensity conditioning regimen

Which primary organs are affected during aGVHD?

- A: Liver, Gastrointestinal Tract, Kidney
- B: Kidney, Liver, Lung
- C: Central Nervous System, Skin, Liver
- D: Gastrointestinal, Skin, Liver

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-657L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPACT OF ENOXAPARIN ANTI-XA MONITORING AND DOSE ADJUSTMENT ON INCIDENCE OF VENOUS THROMBOEMBOLISM IN TRAUMA PATIENTS

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Patients experiencing pelvic, spinal, femoral, tibial, or other extremity fractures, in addition to spinal cord and traumatic brain injuries, have been identified as being at an increased risk of venous thromboembolism (VTE). This risk is due to the body's response to stress and the severity of injury. A trauma-specific risk assessment tool, the Risk Assessment Profile (RAP), can be utilized in this population to evaluate VTE risk. The standard of care for VTE prophylaxis in trauma patients is enoxaparin, a low molecular weight heparin which exerts anticoagulant activity through Xa-inhibition. Enoxaparin is typically dosed at 30 mg subcutaneous twice daily; however, studies demonstrate certain trauma patients may not achieve adequate serum anti-Xa levels with this dosing scheme, potentially resulting in increased rates of VTE. The primary objective of this study is to determine whether the incidence of VTE in trauma patients changes when receiving enoxaparin with anti-Xa monitoring and dose adjustment, as compared to a historical cohort of patients receiving enoxaparin with no monitoring or dose adjustment. The study also aims to identify an appropriate RAP score threshold at which anti-Xa monitoring should be initiated. This retrospective case-control study includes trauma patients admitted between 9/1/15-9/30/16 who received enoxaparin for VTE prophylaxis with anti-Xa monitoring and dose adjustment. Patients will be matched 1:1 based on RAP score weight, and initial enoxaparin dose to a historical cohort who received enoxaparin without anti-Xa monitoring or dose adjustment. The primary outcome is incidence of symptomatic VTE. Secondary outcomes include time to goal anti-Xa level, dose needed to achieve goal level, percentage of patients who achieved goal level with initial dose, time to initiation of VTE prophylaxis, incidence of clinically significant bleeding, length of stay, and mortality. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify differences between the Eastern Association for the Surgery of Trauma and the American College of Chest Physicians guideline recommendations for VTE prophylaxis in trauma patients.

Describe the risk factors associated with trauma patients that place them at an increased risk for the development of VTE.

Self Assessment Questions:

Which of the following statements regarding both the EAST and CHEST guideline recommendations for VTE prophylaxis is correct?

- A: Recommend the use of low molecular weight heparin over unfractionated
- B: Recommend the use of surveillance ultrasound
- C: Recommend the use of mechanical prophylaxis
- D: Recommend the use of vena cava filters in high risk patients

Which of the following place trauma patients at an increased risk for the development of VTE?

- A: Low Injury Severity Score
- B: Traumatic brain injury
- C: Young age
- D: Short bone fracture

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-591L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPLEMENTATION OF A PHARMACIST-DRIVEN DISCHARGE MEDICATION RECONCILIATION AND COUNSELING PROCESS: A TRANSITIONS OF CARE PHARMACIST SERVICE

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Purpose: Pharmacist-led services involving discharge reconciliation and counseling have been shown to reduce readmission rates and increase patient satisfaction. The main objectives will be to determine if a pharmacist-driven transition of care service will reduce rates of readmission for high-risk groups and improve HCAHPS scores related to medications. **Methods:** This study will be submitted to the Institutional Review Board for approval. The transitions of care pharmacist will identify and follow patients who are at high risk for readmission throughout the hospital based on the readmission risk scoring tool used in-house. When a patient is added to the service, the pharmacist will complete discharge medication reconciliation, update the discharge medication list and send it to the hospital provider for approval. Once discharge orders have been written for a patient discharging to home, the pharmacist will bring any new prescriptions and medication information to the patient and provide education related to their medications, including but not limited to the indication for that medication, dosing, administration, adverse effects, and answer any patient questions. The data collection period will be three months. Primary end points will be readmission to the hospital, either through the Emergency Department or a direct admission, and percent difference in HCAHPS scores related to medications. Secondary endpoints will be number of accepted recommendations made by the pharmacist and time spent per patient. **Summary:** Results are still in process at this time. **Conclusions Reached:** Results are still in process at this time.

Learning Objectives:

Identify patients who are at high risk for readmission

Recognize common errors on discharge medication lists seen during the study period

Self Assessment Questions:

Which category for risk of readmission does this patient fall into? 75 year old female who was admitted to the hospitalist service with a past medical history of Diabetes, COPD, HF, CKD IV, and history of

- A: Low Risk
- B: Moderate Risk
- C: High Risk
- D: Does Not Apply

Which of the following is not a common error seen during this study period?

- A: Insulin discharge instructions not included for the patient to take home
- B: Home medication started incorrectly on admission and the error not caught
- C: Duplicate medication therapies
- D: Patients were not supplied with adequate pain control regimens or

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-792L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IMPROVING THE SAFETY CULTURE WITHIN A PHARMACY DEPARTMENT THROUGH ENHANCED COMMUNICATION SURROUNDING MEDICATION EVENTS

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PURPOSE The Agency for Healthcare Research and Quality (AHRQ) defines high reliability organizations as those with systems in place that are exceptionally consistent in accomplishing their goals while avoiding potentially catastrophic error. With increasing healthcare costs, it is important that health organizations prioritize patient safety in an effort to become a high reliability organization. Enhancing safety culture within an organization allows for the improvement of patient safety by addressing the systematic flaws, as opposed to human errors, that contribute to adverse events. The purpose of this project is to improve the safety culture within the pharmacy department through interventions intended to enhance communication related to medication safety. **METHODS** This pre/post-intervention, quality improvement project will evaluate the impact of targeted strategies to enhance communication surrounding safety culture within the pharmacy department as it relates to patient safety issues, medication errors, and event reporting within the inpatient setting. Interventions are designed to provide information to pharmacy staff as well as promote the reporting of medication safety events through direct acknowledgment and positive reinforcement. Primary interventions include ongoing recognition of event reporting, weekly medication safety discussions and email updates, and weekly safety huddles within the central pharmacy. Post-implementation data (collected during March 2017) will be compared to pre-implementation data established as part of a separate project (collected during March 2016). The primary outcome will be post-implementation change in AHRQ Hospital Survey on Patient Safety Culture (HSOPSC) scores amongst inpatient pharmacy staff. Secondary outcomes are the change in number of medication errors reported per 1000 doses administered and changes in the severity of reported medication errors. **RESULTS & CONCLUSIONS** Interventions are ongoing. The anticipated outcome is an increase in HSOPSC scores, thereby reflecting an improvement in safety culture within the pharmacy department. Results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss utilization of a scoring tool to measure safety culture within an academic medical center

Describe communication strategies that may enhance safety culture

Self Assessment Questions:

Which tool can be used to quantify safety culture amongst employees within a hospital?

- A: Hospital Consumer Assessment of Healthcare Providers and Systems
- B: Health Care Quality Survey
- C: Hospital Survey on Patient Safety Culture (HSOPSC)
- D: National Hospital Care Survey

Possible strategies to improve safety culture include which of the following?

- A: Regular huddles discussing medication safety news and recent events
- B: Presentations highlighting safety trends and potential interventions
- C: Direct, positive reinforcement for medication safety event submissions
- D: All of the above

Q1 Answer: C Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-970L05-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

IDENTIFICATION OF MODIFIABLE RISK FACTORS FOR DELIRIUM IN MECHANICALLY VENTILATED PATIENTS IN A COMMUNITY-BASED MEDICAL CENTER

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Purpose: Delirium affects 30-80% of ICU patients and is associated with increased time on the ventilator, longer ICU length of stay, and increased mortality. At Munson Medical Center, the incidence of delirium within the intensive care unit is unknown. The primary objective of this analysis is to identify the incidence of delirium within the ICU, defined by a single positive CAM-ICU exam. The secondary objective is to identify modifiable risk factors that will contribute to positive CAM-ICU scores. This will be accomplished by a retrospective chart review of mechanically ventilated patients at a 400-bed community based medical center. **Methods:** Prior to initiation, this project will be submitted for review to the Institutional Review Board. The electronic medical record will be used to identify patients who are CAM-ICU negative at admission and become CAM-ICU positive during their time in the intensive care unit. Inclusion criteria include patients admitted to the intensive care unit with mechanical ventilation. Exclusion criteria include patients with active alcohol withdrawal, cognitive impairment, and patients ≤ 18 years. The following baseline data will be collected: sex, age, admission diagnosis, and patient type (i.e. medical, trauma). The incidence of delirium will be defined as a positive CAM-ICU exam having followed a negative CAM-ICU exam whilst in the ICU. Patients who are CAM-ICU positive will then be matched with CAM-ICU negative patients based on age and patient type. Modifiable risk factors, including cumulative benzodiazepine and steroid administration and nighttime medication administration 24 hours preceding delirium incidence, will be examined between groups. **Results:** Analysis of results is ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain the incidence and significance of delirium

Identify modifiable risk factors associated with delirium

Self Assessment Questions:

Delirium has been associated with which of the following negative outcomes?

- A: Increased mortality in ICU patients
- B: Prolonged ICU and hospital length of stay
- C: Post-ICU cognitive impairment
- D: All of the above

Which of the following delirium screening tools is recommended by the PAD 2013 guidelines?

- A: Train of Four
- B: Cam-icu
- C: Stop-bang
- D: Chads2vasc

Q1 Answer: D Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-401L01-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

DECREASING TIME TO BROAD SPECTRUM ANTIBIOTIC ADMINISTRATION FOR SEPTIC PATIENTS IN THE EMERGENCY DEPARTMENT

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Purpose: Timely administration of broad spectrum antibiotics has been shown to be directly correlated with decreased mortality for patients with severe sepsis and septic shock. The purpose of this project was to decrease time to broad spectrum antibiotic administration for septic patients in the Aurora St. Lukes Medical Center Emergency Department (ED). **Methods:** An alert within the electronic medical record (EMR) was created to more rapidly identify potentially septic patients in the ED. After receiving the alert, ED pharmacists reviewed the patient profile including differential diagnosis; antibiotic allergies, reactions, and/or previous tolerance; recent bacterial cultures; and any antibiotics already ordered to assess dose and spectrum of coverage. Pharmacists intervened as needed to ensure patients received appropriate broad spectrum antibiotics. Antibiotics were defined as broad spectrum in the same manner as the Centers of Medicare and Medicaid Services defined in the Early Management Bundle, Severe Sepsis/Septic Shock. Education was provided to physicians, nurses, and pharmacists to encourage timely administration. Outcomes to be measured include mean time to broad spectrum antibiotics, percent of patients that received broad spectrum antibiotics within one hour of presentation, and percent of patients that received broad spectrum antibiotics within three hours of presentation. **Results:** Patients who were coded with the ICD-10 codes for sepsis, severe sepsis or septic shock in May 2016 (n = 65) were analyzed to determine pre-alert mean time to broad spectrum antibiotics (2.81 1.63 hours), percent of patients that received broad spectrum antibiotics within one hour (3.1%), and percent of patients that received broad spectrum antibiotics within three hours (67.7%). Post-alert outcomes will be reported at the Great Lakes Pharmacy Residency Conference (GLPRC). **Conclusion:** To be reported at the GLPRC.

Learning Objectives:

Explain the benefit of timely broad antibiotic administration for patients with severe sepsis and septic shock.

Recognize limitations of utilizing electronic alerts to decrease time to administration of broad spectrum antibiotics and increase compliance with the SEP-1 CMS Measure

Self Assessment Questions:

Timely administration of broad spectrum antibiotics results in which of the following for patients with severe sepsis and septic shock?

- A: Increased mean arterial pressure
- B: Decreased mortality rates
- C: Increased cardiac output
- D: Decreased lactic acidosis

What is a limitation of utilizing electronic alerts to decrease time to administration of broad spectrum antibiotics and increase compliance with SEP-1?

- A: Alerts were not sent to the pharmacists in real-time
- B: Alerts only identified approximately 50% of patients that coded with
- C: CMS has vague definitions of what constitutes "broad spectrum" a
- D: CMS criteria for determining severe sepsis and septic shock are b

Q1 Answer: B Q2 Answer: D

ACPE Universal Activity Number 0121-9999-17-751L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

REVIEW OF INSTITUTIONAL PROTOCOL ADHERENCE FOR THE TREATMENT OF DIABETIC KETOACIDOSIS IN A COMMUNITY HOSPITAL

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Purpose: Diabetic ketoacidosis (DKA) is a serious complication of diabetes. Treatment of this condition includes correction of dehydration, hyperglycemia, and electrolyte abnormalities. The American Diabetes Association (ADA) has developed a guideline with clear goals and recommendations for the treatment of DKA. Despite the availability of a protocolized approach, studies have shown adherence to the DKA guideline is inadequate. The main objective of this study is to determine if the treatment of DKA in a sample of adult patients was consistent with institutional protocol. **Methods:** This study has been approved as Quality Improvement by the Institutional Review Board. A retrospective chart review will be conducted using electronic medical records to identify patients who visited the emergency department (ED) and were given a diagnosis of DKA from May 31st to December 31st, 2016. All patients greater than 18 years of age will be included. The primary outcome will be the adherence to the institutional protocol for the treatment of DKA. Patient lists will be computer randomized. The following data will be collected: potassium < 3.3 within 48 hours of admission to ED, appropriate potassium supplementation, initial IV fluid, initial insulin infusion dose, correct start of subcutaneous insulin post resolution, average time between blood glucose levels, number of hypoglycemic episodes, correct discontinuation of insulin infusion, correct diagnosis of resolution of DKA and restart of insulin infusion after resolution. All data will be recorded without subject identifiers. The findings of this review will be used to provide education to both emergency and critical care department staff and implement changes to the institutional protocol if necessary. **Results:** Final results and conclusions are pending and will be presented at the Great Lakes Pharmacy Residency Conference

Learning Objectives:

Describe the recommendations for the initial treatment of patients presenting with diabetic ketoacidosis

Identify the criteria for complete resolution of diabetic ketoacidosis using laboratory data

Self Assessment Questions:

Patient presents to the emergency department and is diagnosed with diabetic ketoacidosis. Lab values are as follows: Glucose 1487 mg/dL, Corrected Sodium 141 mEq/L, Potassium 5 mEq/L, pH 7.25, Anion G

- A: Insulin bolus 0.1 units/kg + insulin infusion 0.1 units/kg/hr + sodium
- B: Insulin infusion 0.15 units/kg/hr + sodium chloride 0.9% continuous
- C: Insulin infusion 0.15 units/kg/hr + sodium chloride 0.9% with potassium
- D: Insulin bolus 0.1 units/kg + insulin infusion 0.1 units/kg/hr + sodium

Which lab values are consistent with a patient post resolution of DKA?

- A: glucose 187, pH 7.3, anion gap 16, serum bicarbonate 23 mEq/L
- B: glucose 560, pH 7.3, anion gap 16, serum bicarbonate 19 mEq/L
- C: glucose 187, pH 7.35, anion gap 11, serum bicarbonate 23 mEq/L
- D: glucose 70, pH 7.34, anion gap 11, serum bicarbonate 19 mEq/L

Q1 Answer: A Q2 Answer: C

ACPE Universal Activity Number 0121-9999-17-864L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
(if ACPE number listed above)

PATIENT SATISFACTION AND UNDERSTANDING OF MEDICATION THERAPY AFTER PARTICIPATION IN DISCHARGE PHARMACY SERVICES

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Purpose: Hospital discharge can be a hectic time for patients and has a large impact on the patient experience as well as patient well-being. Studies show that patients have worse outcomes and increased hospital readmissions as a direct result of inadequate hospital discharge education. This is due to medication discrepancies, poor patient education, and non-compliance. Pharmacist involvement in the hospital discharge process has shown to increase patient compliance and understanding of medication regimens as well as reduce medication errors and discrepancies. This study looks to determine patients' overall satisfaction and understanding of medications after utilization of pharmacy-led discharge services at a community hospital. **Methods:** This quality improvement project was deemed IRB-exempt and consisted of surveying patients prior to discharge from inpatient medical units. This study was designed to determine the value of the current discharge pharmacy services in place at a community hospital. Each day during the two-month study period, patients prepared to be discharged from the hospital were approached by the discharge pharmacy staff and offered discharge pharmacy services. Such services include medication and disease state education as well as providing the first fill of all new or changed medications from the patients' hospitalization. Regardless of participation in the discharge pharmacy service, patients were provided a patient satisfaction survey to complete and return to their nurse before leaving the hospital. This survey was created to identify satisfaction with pharmacy-provided education and the patient-perceived understanding of the provided education. Participation was voluntary and no patient-specific information was collected. Results of the surveys will be compared between patients that used the discharge pharmacy and those that did not. The overall impact of the pharmacy services will be evaluated. **Results:** Data analysis is currently in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the impact of providing medications and counseling to patients before hospital discharge

Identify the barriers to obtaining patient responses to satisfaction survey

Self Assessment Questions:

Which of the following is a benefit of pharmacist-led medication delivery and counseling prior to discharge?

- A: Receiving a discharge summary packet from the nursing staff
- B: Having dedicated time to discuss advance directives
- C: Having dedicated time to ask questions about new medications
- D: Receiving a prescription for new medications to be filled after discharge

Which of the following barriers to obtaining patient responses can pharmacists have the greatest impact?

- A: Forgetting to return the completed survey
- B: Misunderstanding how responses will be used
- C: Lack of interest in participating in surveys
- D: Tendencies to respond positively, even if not accurate

Q1 Answer: C Q2 Answer: B

ACPE Universal Activity Number 0121-9999-17-790L04-P

Activity Type: Knowledge-based Contact Hours: 0.5
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